Orchids and how to grow them in India and other tropical climates.

Samuel Jennings

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BY

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TO

DR. JOSEPH DALTON HOOKER, C.B.

D.C.L. (Oxon.), LL.D. (Cantab.), F.L.S., F.G.S.

PRESIDENT OF THE ROYAL SOCIETY,

DIRECTOR OF THE ROYAL GARDENS, KEW,

IN RECOGNITION OF HIS DEEP INTEREST IN INDIAN BOTANY AND HORTICULTURE,

AND OF HIS UNVARYING KINDNESS

TO THE HUMBLEST STUDENT OF THE SCIENCE

IN WHICH HE HAS ATTAINED SO DISTINGUISHED A POSITION,

This Volume is Dedicated,

BY

THE AUTHOR.

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ORCHIDS:

AND

HOW TO GROW THEM IN INDIA AND OTHER TROPICAL CLIMATES.

CHAPTER I.

INTRODUCTION.

Eight years ago but little was known in India of the habits and requirements of that most interesting Order of Plants the Orchidaceæ. It was commonly supposed that, being natives of the hills or of the moist swamps at the foot of the hills, any attempt to introduce them into cultivation in the gardens of the large cities of India must prove a failure. That they had been seen occasionally displaying their wonderful flowers at the shows of the Agri-Horticultural Society many years before the period alluded to is on record; these were, however, plants but recently imported from their native habitat, which after flowering once were invariably neglected, and of course perished in the burning heat of their first summer in the Plains. The Botanical Gardens in Calcutta possessed a small collection including a very few of the Exotic species and isolated specimens, particularly of *Oncidium luridum*, and two or three small Epidendrums might be met with in a few gardens belonging to wealthy natives; beyond these but little interest was shown in these curious and lovely plants. A great change has now taken place, and no garden of any pretensions is considered complete without its Orchid house; and the success which has attended the cultivation of these plants leads to the belief that an extended knowledge of their habits will lead to their increased popularity not only in India, but in other tropical countries where at present they are entirely neglected.

In the Botanical Gardens at Calcutta may now be seen a remarkably fine collection of, not merely indigenous Orchids, but also of many splendid foreign species which bloom year after year. In the dry and scorching plains of Central India and the North West Provinces success has also attended their cultivation, and the writer feels not the slightest doubt that equal success may be achieved in almost any other locality in the tropical world.

The object of this work is, in the first place, to afford such information to residents in tropical climates as shall enable them to appreciate and cultivate satisfactorily one of the most beautiful and fascinating of all classes of plants, and by placing so much of the writer's personal experience within the reach of all as may assist in saving thousands of valuable plants which are annually imported into Indian gardens only to perish for lack of such knowledge.

This is a more serious object from a scientific point of view than may at first sight be supposed. It is greatly to be feared that in a very few years some of our most highly

prized species will absolutely cease to be found growing wild; will, in other words, exist only as dried specimens in our Herbariums, so terrible are the ravages often made by commercial collectors in the forests where such plants are found. During the writer's recent stay in England he has been surprised to learn how rare are some of the plants, which years ago were far more numerous, and he can likewise bear personal testimony to the fact that some of them can no longer be found in localities where formerly they were abundant. *Vanda cærulea* is a remarkable instance of this sad fact; so slow is their propagation that this gradual extinction is scarcely to be wondered at, when it is known that thousands of pecimens are annually removed for export. This subject is rendered still more serious when it is beginning to be feared that there are men who traverse these forests in search of rarities, whose habit is to destroy all plants they cannot carry away, to prevent their falling into the hands of rival collectors. That such a practice should exist is a blot upon the honour of a trade deservedly high in scientific reputation, and the fact demands the serious attention of all concerned in the subject; it is to be earnestly hoped that such instructions are quite exceptional.

Finally, the writer is not without some hope that the publication of his practical experience in a hot climate may afford some information to English cultivators, who may not think it beneath them to adapt some hints to the altered circumstances under which they grow these plants in a colder temperature, and possibly deduce some fresh information which may lead them to modify their present treatment, and arrive at a stage nearer perfection. Opinions on the subjects of soil, heat, light, and moisture still vary considerably, and the nature and habits of some species are scarcely known at all, and the result is failure; the lovely Anæctochili, which seem to be perishing in all directions, will furnish an example of this want, and it is to be hoped that, in approaching this subject from an entirely new point, some fresh information may be afforded, which may be of service to Horticulture even in this country.

CHAPTER II.

CULTIVATION OF ORCHIDS.

The cultivation of Orchids may be attempted with good prospects of success in almost any tropical country. In India there is a very considerable range of climate and temperature, from the hot moist valley of Assam to the dry and scorching plains of the Punjab, where, in the cold weather, the frosts are quite powerful enough to do serious damage to tropical vegetation. Throughout the whole range Orchids may be seen growing and flowering in many private gardens, where a little care and attention have been bestowed upon them. In a cold climate, such as that of England, it is not a matter of much difficulty to preserve an atmosphere suitable for these plants, as, under glass, the temperature can be raised and the humidity regulated at will; but it is quite otherwise in a tropical country where, when the thermometer indicates 110° in the shade, it is by no means an easy matter to reduce this heat to something more moderate, and to keep down the reduced temperature. Yet even this can be done by means of evaporation. Fortunately, this terrible heat does not last a very long time, and from the returns published by the Curator of the Botanical Gardens at Calcutta, it will be observed that on the very hottest day in 1869–70, the thermometers in the plant houses did not register a greater degree of heat than 94°, although even that is a much higher temperature than any Orchids absolutely require. This reduction was accomplished in a conservatory where the plants are only screened from the sun and air by light bamboo frames, thinly covered with dried grass, through which the broken sunlight could reach them; but in a plant-house of more careful construction, which, during the scorching heat of mid-day, can be entirely closed in with frames of wood upon which has been stretched a light thin cloth, by occasionally damping the roof, a still more considerable reduction in temperature may be effected, without depriving the plants of the necessary sunshine in the early morning. There are, of course, many Orchids which it would be almost hopeless to attempt the cultivation of in the plains of India, such as the beautiful species now becoming so deservedly popular in English greenhouses—natives of the higher ranges of Mexico and Guatemala, where they are found growing at great elevations; but these very plants ought to thrive well in the hill stations of Simla, Mussoorie, and the Neilgherries, particularly if protected from the frost in severe weather; and in places where plants are removed from the hills to the plains in the winter, as is frequently done in India, no difficulty whatever should be experienced in their management.

CHAPTER III.

THE HISTORY OF ORCHIDS.

In all ages of the world's history, even in the very earliest times, the charms and uses of the Vegetable Kingdom have occupied the first place in the attention of man. Horticulturists claim Adam as the first member of their fraternity, and in the Sacred Writings frequent allusion is made to the beauties of the flowers. The Great Teacher of mankind Himself alludes to them, and pointed one of His most poetical lessons when He said, "Consider the lilies how they grow." We have thus the highest authority for the study of flowers, so few of which can be said to be of any economic value. Elegance of form, richness or delicacy of colour, charm the eye and gratify the senses, and we are constrained to ascribe our gratitude to Him who has "done all things well," even to the adornment of the virgin forest, untrodden as yet by the foot of man, but which, at some future time, shall yield its treasures for his benefit. Thus has it been with Orchids, which to a comparatively recent period have been altogether unknown. A hundred years ago, a few species were known to botanists as curiosities, none were in cultivation. Linnæus, the father of modern botany, who died in 1778, mentions his belief, in one of his works, that if the world were thoroughly explored, possibly a hundred different species of Orchids might be found. As recently as 1815, there were but 25 species in cultivation in Kew Gardens, and what have we now? A grand Order of plants, composed of over 400 distinct genera, subdivided again into possibly 5000 or 6000 natural species; these again admit of an endless range of variety, to say nothing of the result of the labours of such men as Mr. Dominy, whose success in producing hybrids of astonishing beauty, has been the distraction of the severe botanist, and the admiration of all lovers of the beautiful. The records of the Royal Horticultural Society are constantly attesting the discovery of new and beautiful species, and it is no unreasonable thought that the time will come when the present number may be doubled; there are still many regions teeming with luxuriant vegetation which offer a grand field of discovery to the enterprising botanist. What is known of the interior of New Guinea, Borneo, Sumatra, Formosa? What of the forests of the Indian Peninsula, of Burmah Proper, of the Chinese Frontier? And in the West? Central America is by no means as yet thoroughly explored. We know not what treasures lie hidden in damp tropical Africa, but we know that Madagascar is rich, and it is not unreasonable to hope for grand discoveries when the mighty continent adjacent has been fully explored.

The oldest known Orchids are those of terrestrial habits, such as those of our own country—the *Orchis* for example, and the beautiful *Cypripedium calceolus*, still sometimes found growing wild in our own woods—but the epiphytal species were never dreamed of until the discoveries of Rumphius and Kœmpfer were made known to the world about the commencement of the eighteenth century, and it was not till more than a hundred years later that living specimens were brought to this country and cultivated with any degree of success, when—thanks to the liberality of such men as the late Duke of Devonshire, Mr. William Cattley of Barnet, and the Messrs. Harrison of Liverpool, whose names are well known as the first importers and growers of exotic species—popular attention was attracted

to their wonderful beauty and the peculiarity and diversity of their forms. It was no longer left to the casual missions of travellers abroad to supply the hot-houses of these wealthy amateurs with specimens. Men of perseverance and intelligence were specially despatched to collect them in their native forests and forward them direct to their employers—a task involving no small amount of personal self-sacrifice; for these energetic explorers had many and serious difficulties to encounter, danger to life and health from exposure to malarious swamps and the heat of a tropical sun, not less than from the treachery of the savage inhabitants of the districts visited. All honour to the men who have thus gone with their lives in their hands, the pioneers of botanical research in the tropics, so many of whom have fallen martyrs to their investigations, or have returned with broken health consequent on their exposure and privations. What branch of scientific inquiry has cost so much labour and personal endurance? Nor should we fail to bear testimony to the princely liberality of the enlightened nobleman who first supported, at so great a personal expense, the responsibility of these foreign expeditions, and not less the enterprise of such nurserymen as Messrs. Veitch and Loddiges, who so quickly followed his example. In the present day the difficulties which surround the collector of Orchids in the tropics have been greatly mitigated—the spread of civilization is no small protection to the European traveller east or west—and the dearly purchased experience of his predecessors is available to assist him in providing against many difficulties which formerly seemed almost insurmountable; this applies in a modified degree to adventurers who push their way into unexplored territory, but even they may benefit not a little from the experiences of others.

Many of our most popular Orchids we owe to the researches of residents abroad who in the course of their wanderings and holiday excursions have directed their attention particularly to the discovery of new Orchids, foremost amongst whom should be named the Rev. C. S. Parish, M.A., the Chaplain of Moulmein, and Colonel Benson of Rangoon.

CHAPTER IV.

NOMENCLATURE OF ORCHIDS.

Orchid nomenclature has always been a great difficulty with many amateurs, who cannot understand why these lovely flowers should be known only by such outlandish names. The question is often asked, "Never mind the Latin, what is the English name?" With the exception of a very few indeed, we can give no English names, and for the very good reason that no English name is necessary. Amongst scientific men, it is an understood thing that Latin and Greek are the best languages for conveying in one word, a description from which it would be possible universally to recognise the plant so named. In every case two names are given, the first of which indicates the "genus" to which the plant belongs, and the second describes the peculiarity which distinguishes it from all the other members of that group; thus, when we see *Dendrobium densiflorum*, we understand that it is that particular Dendrobium the flowers of which hang in close dense clusters. This very sensible rule has, however, by no means been strictly adhered to, for we are not unfrequently puzzled to understand how some names have come to be applied. Some appear to be absolutely meaningless, others have been given in compliment to some distinguished person, others again commemorate the name of the discoverer. The rule laid down by Sir Joseph Paxton is, that when the plant is named after its discoverer, or introducer, it is Latinized with the use of the genitive case, terminating in *æ*, or *i*, as for example, *Cypripedium Sedeni*—in English, Mr. Seden's Cypripedium; but when the name is given in compliment only to some eminent person, who is not actually either the discoverer or introducer, the accusative case should invariably be used, as in *Dendrobium Cambridgeanum*, which flowered at Chatsworth for the first time in this country, when the Duchess of Cambridge was visiting the late Duke of Devonshire in 1838, and hence its name. When once a plant has been botanically described and named, it is an understood rule that the name so given shall hold good; hence we have occasionally adopted new and incorrect names, which upon investigation have to be dropped. Mere varieties of size and colour are not considered sufficient to justify a separate specific name, but such varieties are not unfrequently indicated by the addition of a third name, as *Phalænopsis grandiflora aurea*, which is in allusion to the deeper golden colour of the flower than in the ordinary *Ph. grandiflora*, which it resembles in every other particular.

Generic names have usually been applied by the botanist who has arranged and separated the group or family indicated, new members of which still continue to be added to it, all bearing the same generic or surname. These are selected for the most part to describe some peculiar characteristic common to all the different species belonging to that genus as distinguishing them from all the other genera: thus it is with the genus *Cymbidium*—all of which may be recognised by the peculiar form of the labellum, strongly resembling the ridges upon the bottom of a boat. Here again the rule has by no means been maintained, for we in "Cattleya" a genus named after a celebrated cultivator, and in "Lælia" a name the meaning of which indicates a character equally shared by other Orchids too numerous to mention; the two genera *Epidendrum* and *Dendrobium* virtually have the same meaning, "living upon a tree," a peculiarity by no means confined to those genera, nor, indeed, to all Dendrobia alike, for

many grow upon moss-covered rocks. But we have these names and must make the best of them, such as they are, until some great botanist shall arise who will undertake the herculean task of the rearrangement of the entire order, in so satisfactory a manner as to command the adhesion of the whole scientific world; and there is no reason why these Latin names should not in time become as familiar to us as many others have already which are universally and popularly known as Azaleas, Geraniums, Fuchsias, and Verbenas.

The great authorities of our own day upon the classification of Orchids are the late Dr. Lindley, Dr. Hooker, the President of the Royal Society, and Professor Reichenbach of Hamburg; the last-named gentleman having made this order his peculiar study is recognised by all as the final referee in all matters relating to Orchids, and more particularly bearing upon their nomenclature and description.

CHAPTER V.

ORCHID HOUSES.

In Bengal and other tropical countries which are but little affected by dry hot winds, where during the summer the atmosphere is always more or less loaded with moisture; regions bordering on the sea, such as Burmah, Madras, and the Indian Isles, the best accommodation for plants would be a conservatory of light bamboo frames, made of diagonal lattice work, upon which is thinly strewed a quantity of dried thatching grass, sufficient only to permit a subdued light to pass through to the plants, supported on strong teakwood or iron pillars; the sides capable of being lifted and supported on props when a free current of air is desirable, or tied down to close in the plants on a dry scorching day, and the roof flat, to admit of partial sunlight and rain. Care must be taken to build such a conservatory away from the shade of trees, from the branches of which the drip of rain is frequently highly injurious, and the shade of the leaves too dense for the health of the plants. Orchids want sunlight, but they cannot as a rule endure the scorching effects of the full direct beams of a tropical sun. To accomplish the happy medium must be the aim of the intelligent cultivator.

Where bamboo is used, care must be taken to see that they are properly matured, and fit for the purpose, as if split up and used in a green state they soon become rotten and infested with a weevil, which will perforate them through and through, making the plants constantly untidy with the dust bored out of the wood. It is a very good plan to steep all bamboos in water for at least a fortnight or three weeks before use.

The floor of the Orchid House must be well beaten and rolled, and not the least shelter afforded for such dangerous visitors as cockroaches and crickets, who will do more harm in a single night than can be remedied in a year's careful nursing. A masonry floor is by far the most preferable where expense is no object, with all interstices carefully filled up with plaster. Whenever it is necessary to reduce the temperature and increase the humidity in such a house, all that is required is to syringe the grass frames and flood the masonry floor; it will sometimes be advisable to do this three times a day in the months of May and June in Bengal. The plants should never be allowed to stand on the ground, but upon raised staging, or hung upon frames or to the roof. In the cold weather especially, it will be

found that the health of all Orchids will greatly suffer from the effects of radiation if the plants are allowed to stand near the surface of the ground at night.

The climate of the North Western and Central Provinces of India and the Punjab differs very materially from that of Bengal and Burmah. Here in the winter the cold is greater, and in the summer it is both hotter and drier. To attempt the cultivation of Orchids in a house such as described as suitable for the Lower provinces would but result in failure and disappointment. So terrible are the effects of the hot winds which prevail during the months of April, May, and June, that all vegetation soon appears burnt up. Many trees lose their leaves; even the grass disappears entirely if left long unwatered. Gardeners are at their wit's end to know how to preserve their treasures from its baneful influence, and Orchids would soon cease to exist unless specially cared for. In such a climate the best Orchid House would be one built upon English principles, with moveable frames. At the first indication of the approach of the hot winds, the glass frames should be taken out and stowed away for replacement in the cold weather, and others, carefully covered with a light thin white cloth, substituted. At the west end of the house, that upon which the hot wind blows, there should be fixed a "*cus-cus tattie*," kept constantly wet, and two or three times during the hottest part of the day the cloth of the roof should be syringed from inside the house. There will then be a very fine spray floating in the enclosed atmosphere, and the action of the sun upon the wet cloth producing evaporation, the temperature will be considerably reduced. At the commencement of the rains the cloth would have to be removed, and the house left open, but on the approach of the cold weather it will be found necessary to replace the glass, as many plants will then need protection from cold.

Orchid Houses built on the principles adopted by European horticulturists will have sloping or arched roofs, which will necessitate care lest the rain passing under the glass, or the moisture condensing on the inside of the roof, should fall in large drops upon the plants, and thus, perhaps, do them serious injury. This difficulty can be obviated by the construction of zinc gutters under each rafter, along which the water can run to the sides of the house.

It is of much importance that each conservatory be supplied with an open tank to contain water; where space is limited, the tank might be placed under the staging on which the Orchids are arranged, so that the vapour arising from the surface of the water may pass between the plants. At one end of the house a very pretty arrangement might be made, by combining rockwork with a waterfall or fountain, planting ferns, begonias, and other beautiful plants among the pieces of rock, and suspending Orchids in baskets over the water.

In the Hill Stations of India a great deal might be done in the cultivation of the charming cool Orchids, which do not require a higher temperature than 65° to 75°, amongst which might be named the Odontoglots, and some of the cooler Cattleyas and Lælias. These would scarcely need shelter in the warmer months of the year, but would require protection from frost. If, however, it is desired to grow Orchids from the more tropical regions, such as Aerides, Vandas, Saccolabiums, and many Dendrobiums, artificial heat must be resorted to, as these may need a temperature in summer of 85° to 90°, which is much higher than that of the Hills, except when exposed to direct sunlight. In such a case, a closed conservatory is recommended, properly glazed and ventilated, with very simple warming apparatus, consisting of a kettle of water kept at the boil, with an escape for the steam so long as it is necessary to keep the temperature above that of the atmosphere outside, and adding fuel and water whenever either becomes exhausted. But the attempts which are now being made in

England to grow even Indian Orchids at a more moderate degree of heat than that with which it has hitherto been customary to furnish them, are meeting with decided success, and it is believed that many of the charming Dendrobes of Sikkim and the Khassia Hills, as well as Aerides and Vandas from Upper Assam and Burmah, would not only grow well, but flower successfully at a temperature seldom exceeding 80°. If this be correct, cultivators in the Hills of India need not fear to attempt even such Orchids without the more expensive arrangement of hot-water pipes.

In England, where it is desired to cultivate plants which are natives of tropical regions, contrivances are resorted to by which the temperature and humidity of the enclosed atmosphere can be raised by fire heat to the required degree, and many ardent lovers of exotic beauties have felt how great has been the drawback to their perfect enjoyment of these delightful foreigners on account of the close steamy air it is considered necessary to keep up in the Orchid House. A very different vision may be indulged in by the dwellers in the sultry plains of India. We live in an age of progress—we are more advanced this year than we were last. Many a fanciful dream of years gone by, which was then dismissed as a something "too good to be true," has found its realization in the present day, and a new hope is now held out to our friends suffering from tropical heat. An apparatus has recently been invented for the purpose of cooling a current of air passing into an apartment to any degree of cold which may be desired, and keeping the temperature down to that point. The writer has seen this very clever contrivance, and its applicability to the cultivation of temperate plants in hot climates at once flashed across his mind. This is the very thing we have been so long yearning for, but, alas! as yet it is too costly to make it available for any but the wealthy to indulge in. Comparing it, however, with the cost of heating apparatus in England, the first outlay is not so very much more, whilst its working expenses will be considerably less; and its applicability to other objects in addition to and simultaneous with cooling air—as, for instance, the manufacture of ice and preservation of meat—will render it a very desirable annexe to a large house in India. So far, then, from avoiding the Orchid House on account of its disagreeable atmosphere, we may expect some day to find the conservatory, in the tropics, the most delightful resort of its possessor—the coolest room in the house, where, surrounded by graceful forms and lovely tints, the amateur gardener may pass his leisure in comfort, even during the hottest time of the day. The principle is, of course, evaporation; the material used, ether, which will require but seldom renewal; the working apparatus is an air-pump, and the air is forced by means of a fan-wheel, made on precisely the same principle as an Indian thermantidote, through a pipe coiled inside the refrigerating chamber, and passes into the room in a continuous stream.

One disadvantage is almost certain to follow the use of such an apparatus in India, and that would be the congregation together of all the flies within reach, as they invariably select the coolest places for their daily resort. They must be anticipated, and their ingress as much as possible prevented by the use of mosquito-curtain net at the ventilators, &c. The advantages, however, are so great, that it is to be hoped that before long such cooling machines may be considered an indispensable adjunct to every well-built house, cold air being laid on in exactly the same manner as gas is now.

CHAPTER VI.

ON THE SEASONS OF REST, GROWTH, AND FLOWERING.

In order to understand the treatment required by Orchids in a state of cultivation it is very necessary to be acquainted with their habit of life in the districts where they are found. There are certain general rules applicable to almost the whole Order, and there are special rules which govern the health of individual species—for example, Orchids need a certain amount of rest each year, or they become exhausted and refuse to flower. This is a general rule and applies to almost every Orchid in cultivation, but this rule does not apply *equally* to every species or indeed every genus alike. There are some that need a very long rest and others which seem to thrive with very little indeed; and more than this, there are some plants which in a state of cultivation appear to have greatly changed the conditions under which they flourish: species which, in their native haunts, are *deciduous*, in the Orchid-houses of England are unquestionably *evergreen*. These special conditions will be alluded to in detail in the descriptions of the different genera and species as they occur in connexion with the Plates; for the present we deal with general rules.

It must be borne in mind then, that Orchids require three distinct seasons in the course of the year, without which it is almost impossible to keep them in a healthy state. The growth must be vigorous and uninterrupted, and when complete, the plant must have rest and the wood must harden and ripen before the flowering period which is to afford to the industrious cultivator the rich reward for all his toils in the beauty of the expanded blossom. We may term the three seasons—1st, that of growth; 2nd, that of rest; and 3rd, that of flowering. There are some species, however, which bloom from their completed new growth, and before rest, such as the "Thunia" and others; but not the less is rest absolutely necessary, or the next year's shoots will be weak and sickly, and no flowers will be put forth at their completion.

Others again, exceptions to the above rule, as has already been mentioned, seem to require but little or no rest. These are natives of a moister climate and must never be allowed to become dry and shrivelled. Many of the Vandas belong to this group, particularly those which are natives of the hot moist valleys of the "Terrai" below Darjeeling or the equatorial islands of Java and Borneo, where they are found growing at low elevations.

In India the period at which Orchids are in a dormant state is the cold weather which begins with the month of November and lasts till about the middle of February, and it is during these months that the plants are in the most favourable condition for removal from the forests, also for re-potting. They will endure long journeys if carefully packed, and suffer but little injury from confinement or want of air and light. It is during these months that Orchids should be removed from the trees or rocks upon which they have grown, but it is not desirable to send them from India to Europe until the spring, so that they shall not be exposed to the risk of injury from frost on arrival.

During the cold weather the perfected stems and pseudobulbs of the Orchids will be hardening; they now require plenty of light, sunshine, and air, and only just sufficient water to prevent the plants from shrivelling, and that should be applied rather on the floors and

brickwork of the house than on the plants, to increase the humidity of the atmosphere so that nourishment may be afforded through the aërial roots and pores of the leaves, rather than to apply water directly to the soil or moss at the roots of the plants. Each individual specimen should now be carefully watched for the slightest indications of want of moisture. Some species will require an occasional sprinkling, but it must be applied with a sparing hand. Vandas, Phalænopses, Aerides, and others with fleshy leaves, at once show when water is necessary, as they become flabby instead of remaining firm and rigid. The pseudo-bulbs of Cattleyas, Dendrobiums, Cœlogynes, &c. should continue plump and full, and the moss in baskets or on the stumps should be felt every morning to guard against its becoming too dry. In Bengal during the cold months there is almost always sufficient moisture in the atmosphere from the frequent fogs at nights to supply all that is needed without resort to artificial watering except on unusually dry and hot days for the season of the year. The same remark applies also to the more Northern and Western portions of India, but the air is drier, and damp fogs less frequent; hence more watering will be necessary. During the cold weather it is most important to guard against the baneful effect of the frosts which so often occur in Upper India. There the plants must be under the shelter of glass, as some Orchids, particularly Phalænopses, will be pushing forth their delicate flower-shoots, which would be perfectly ruined if exposed to the slightest frost. The effects of radiation must also be considered; this causes a fall of temperature within a few feet of the ground sufficient to do considerable damage, which, had the plant been under shelter or raised above its influence, might have been prevented. Even in Bengal, where frosts are unknown, many plants are thus lost in the cold weather which would in all probability have been saved had they been screened with the lightest possible material.

It must be remembered that although many of these plants come from districts where the cold is far more felt than in Bengal, their usual growing situation has been on the branches of lofty trees, and consequently far above the influence of the reduced temperature at the level of the ground, whilst in cultivation they may frequently be seen in pots, standing in an exposed situation, sometimes actually on a grass lawn, the very worst possible place for them.

Comparing the climatic conditions under which Orchids naturally grow in their native haunts with the artificial atmosphere kept up in an English hot-house in the winter months, it is not difficult to account for some of the changes of habit which have already been alluded to. The fact that whilst naturally nearly all Dendrobes are deciduous, in cultivation many are evergreen, arises from the much greater amount of humidity invariably supplied in the artificial atmosphere than that to which they have been accustomed in nature; the result is a certain amount of movement of sap to supply the requirement of leaves which should have been reserved for subsequent utilization in the production of flower-shoots when the plant has been started into growth at the close of its season of rest.

As soon as the weather becomes warmer, the plants will show signs of renewed activity, the pseudobulbs of Dendrobes will begin to swell at the joints, and tiny growing shoots will make their appearance. This, in Bengal, may be expected early in the month of February, in Upper India a fortnight or three weeks later. The supply of moisture must now be gradually increased in proportion as the days become hotter, but care must be taken at this period to water most sparingly until it is quite clear that the flower-buds are properly set, as it very often happens that when the plant is too powerfully stimulated by the too free supply of water, buds that under more careful treatment would have produced flowers

are forced into mere leaf development. The flowering period is now at hand, and it will be advisable to set apart a portion of the Orchid House specially for plants coming into bloom, as the delicate beauty of the flowers will be sadly impaired by contact with water, and they will retain their bloom much longer if kept with only just sufficient moisture to check the rapid growth of leaf-shoots, and that ought to be applied at the roots, and under no circumstances over the leaves or flowers of the plants. The drier and cooler the atmosphere can be kept, the longer the flowers will last.

A more lovely object than an Orchid in full bloom it is difficult to imagine in a drawing-room or entrance-hall, but it is important that they be protected from draughts of cold air, which will be sure to injure the plant. When the bloom has passed away the Orchid should be replaced in the house where it is to stand during growth, and overhead watering may be afforded by gentle degrees until it is seen that the young shoots have fairly started, and the third period—the growing season—commenced; this, in India, will be at the beginning of the hot weather. The supply of water must now be regular and abundant. At first daily, and then twice a day, morning and evening, and when the heat becomes very great, it will often be found necessary to water the plants three times a day, besides flooding all the stands, paths, and sides of the house. In the Upper Provinces affected by the scorching winds which often prevail for a month or six weeks without intermission, the greatest care must be taken to shelter the growing plants from its baneful influence. The effect of the hot wind is to check vegetation, drying up the sap, and in the case of many trees, causing the leaves to fall. To check the growth of an Orchid at this period would be attended with the most serious results, as it is most difficult to coax a young shoot into renewed growth; too often the result will be a stunted pseudobulb, and possibly the fresh effort of the plant may take the form of an entirely new shoot, which can never reach full maturity, the strength of the plant being expended upon the formation of two bulbs which should have all gone to the perfecting of one; the result will naturally be that neither will reach its full development.

Orchid Houses in the Upper Provinces should now be covered in with light cloth, kept as damp as possible during the day; all interstices must be carefully closed—on no account must the door of the house be left open during the day—and above all, constant personal supervision will be necessary at this critical period, or the native gardeners (*Mallees*) will to a certainty neglect their duties and terrible mischief may ensue.

The glad period at which the first refreshing showers of rain descend to cool the parched ground will be the signal for a change in the treatment of the plants. The air will often be loaded with vapour, which will supply naturally all the moisture the plants will need, but dry hot days will intervene when it will be necessary to resume artificial watering. The fear now will be lest the Orchids get too much moisture, particularly towards the month of September, when in most cases the growth having been completed, the plant will seek rest, and if over-excited with water it not unfrequently happens that the plants will put forth fresh shoots from the already perfected bulbs, which should not have started until after a long season of rest. It is well therefore to remove the plants which have completed their growth to the driest and coolest place possible, and keep them quiet and free from stimulus, atmospheric moisture being now ample for every requirement. During the rains it is necessary that the plants should have as much air as possible. In a confined damp atmosphere there will be a tendency to rot and the growth will be too rapid, and consequently weak, and the plants will look weedy. In Bengal the best situation will probably be where the plants will

have the benefit of the freest circulation of air and at the same time not be exposed to the direct rays of the sun. Towards the close of the rains a couple of hours' morning sun, when the plants are dry, will be attended with great advantage to the Orchids, as it will greatly assist in ripening the pseudobulbs and wood, and preparing them for the season of rest.

CHAPTER VII.

GENERAL MANAGEMENT.—POTTING AND MOUNTING.

To understand the requirements of a plant so as to bring it to grow and flower well in a state of cultivation, it is of the utmost importance to study well its habits in nature, and the localities as well as the soil and climate where it is found. Not by any means that it is always advisable to imitate such conditions as nearly as possible under an artificial state of existence, but this knowledge is valuable to assist the cultivator so to modify his own treatment, taking climatic circumstances into consideration, as to produce such conditions as shall be most suitable for his plants where they have to grow. It follows then, that the treatment which meets with the best results in England may, by no means, be that which shall afford the most satisfaction in India. The direct sunlight doubtless plays a most important part in perfecting the growth and deepening the colours of all tropical plants, and a great deal of the sun's influence is cut off from them when they are grown under glass; this in a great measure is proved from the fact that the same plants bloom with much richer colours in India than they do in England; shaded sunlight is very different in its effects from the diffused light which is secured in the grass-houses already described. The same may also be said of the material used in potting. In England many epiphytes are grown in baskets filled with fibrous peat; such treatment would be their ruin in a tropical climate, more especially where there is a great deal of atmospheric moisture; and the same difference should also be made in the drier climate of Central India, where every effort should be made to prevent the too rapid evaporation of the moisture. In the hot weather in those districts where the sun and hot wind would take but a very few minutes to dry a thoroughly saturated piece of cloth, recourse is had to double pots, filling the interstices with wet moss or sand, which is of considerable assistance in keeping the roots cool. The best season for re-potting and re-mounting is the cold weather when the plants are at rest, but the operation may be performed without danger, if the plant is strong and healthy, at any time before the new and tender shoots make their appearance. There are times, however, when re-potting must be done irrespective of season altogether, as the lesser of two evils—that is, if the soil has become sodden, or sour, or the pots infested with noxious insects; then with the utmost care break the old pot, and wherever the roots have attached themselves, allow the pieces of crock to remain planted in the new pot after thoroughly cleaning them. In such an event it is important to avoid touching the growing points of the roots, which upon examination with a microscope will be found to consist of numerous hollow cells, like sponge: a light touch would be quite sufficient to break down their delicate walls and completely stop their development. The best pots for Orchids are made very shallow, with drainage-holes all round the sides, but these are by no means so handy or sightly as pots of the ordinary

shape. To meet the difficulty a capital pot has been invented by Mr. Dominy, who assures the author that he has used it with the utmost success for many years, finding it far superior to any other method of potting; and to judge from the appearance of a noble plant of *Lælia anceps*, which had been undisturbed for years, Mr. Dominy's plan must be worthy of being better known. His pots are made in the usual shape, but with holes round the sides near the rim; about one-third of the distance down the inside is an interior rim, upon which rests a moveable earthenware disc containing one or more holes and nearly fitting the pots. Underneath this disc is of course open space, for free circulation of air; the drainage is perfect, and the use of broken crocks entirely dispensed with. Mr. Dominy does not like crocks; "they get covered with fungi," he says, "and need frequent changing." It is quite astonishing to see how the roots of Dendrobiums, Cattleyas, and semi-terrestrial Orchids attach themselves to this disc, often completely covering it—a sure proof of the advantage of this system. As such pots cannot always be procured in India, the best must be done with such as are available.

In potting Orchids the first essential is perfect cleanliness: the plant, leaves, and roots should be thoroughly washed in lukewarm water and all soil and dirt removed, and dead roots cut off with a pair of scissors. The pot selected should not be too large for the size of the plant—over-potting is admitted to be a great mistake; it should be perfectly clean, inside and out, and all the pieces of broken crocks used for drainage ought likewise to be well washed. Drainage must be complete; this is secured by placing about an inch depth of broken crocks at the bottom of the pot. The material for filling up should be a mixture of charcoal in lumps, and pieces of vitrified brick, called in India "jammah," the refuse of the brick-kilns broken to a convenient size, the larger pieces being placed below and the smaller near the surface. Where there is a considerable mass of fleshy roots, as is frequently the case with fine specimens of Vanda, Aerides, and Saccolabium, it is sufficient to fill the pot, building the lumps carefully and firmly around the stem till the roots are all covered, and finishing off with a top-dressing of fresh moss. But if the plant has but little root, it is a very good plan to fasten it securely to a small block of wood with copper wire, and sink the block in the potting material, covering all with moss as before. Avoid the use of cocoa-nut fibre and dust, as it soon becomes sour in Bengal, and harbours many destructive pests which feed on the young shoots and root-tips to the serious injury of the plants; for the same reason peat is equally objectionable.

In Central India and the Punjab, however, it is necessary to afford something more than lumps of charcoal about the roots of epiphytal Orchids; the best material is moss, but when that is not procurable, the dust beaten out of cocoa-nut fibre may be substituted, mixed up with the lumps in the pot, but the drainage must be kept quite clear. In all cases it is necessary to take care that the crown of the plant is quite free above the surface, and the roots securely fastened, so that all is firm, and no danger of friction to the new roots, which will need to adhere closely to any pieces of brick or charcoal they may come in contact with. During the continuance of the rains in India the top-dressing of moss should be carefully removed, as there will be abundance of moisture in the atmosphere for all requirements.

The above mode of treatment is recommended for all epiphytal Orchids which, like Vandas and Aerides, have no fleshy pseudobulbs. Phalænopsis, Cattleyas, and the more delicate species are best grown on blocks of hard wood, half sunk into potting material, so that the whole plant is above the surface, but protected with moss, and the roots, when well pushed

out, can seek the protection of the charcoal. In the North-Western Provinces and the drier parts of India, rustic baskets are preferable to pots; the roots seem to thrive much more satisfactorily, and there is less danger of rot from excessive watering, as the drainage of necessity is more perfect. Small baskets are recommended in all cases in preference to block culture wherever the effects of the hot wind are felt, and their appearance is always neat and pleasing, besides their being so much more manageable than the heavy stumps of wood so frequently used in Indian gardens. These baskets are most easily made; in shape they are best square, and as small as possible consistent with the size of the plant. Cut the bars of wood into even lengths—teak wood is by far the best, as it is clean and hard, and resists the effects of moisture longer than any other; take care that the holes be all exactly the same distance from the ends; then take four lengths of sufficiently strong copper wire, one for each corner, fastening the ends to the lowest bar and passing it through the holes at the extremities of each bar as they build up alternately to the right and left of each corner to form the basket; the upper ends of the wire should then be brought together to form the handle by which the whole may be suspended from the roof or other place where it is intended to be placed; the bottom of the basket is formed by nailing similar bars across, leaving interstices between each for drainage and ventilation. Almost all descriptions of epiphytal Orchids prefer basket to pot cultivation, as they delight to coil their roots round the woodwork, or to hang them loosely in the air through the open bars. Plants grown in baskets lined with moss and filled up with lumps of charcoal and broken brick, may be occasionally plunged into tepid water with considerable benefit, there being no danger of an accumulation of wet, through the drainage being choked up, as so frequently is the case with pots. Here also care must be taken that the growing points in such plants as Cœlogynes, Cattleyas, and Dendrobiums be not smothered up with crocks or moss; they should always lie on the surface freely exposed to light and air.

When it is desired to mount an Orchid on wood, the best plan is to use flat boards of teak, or sissoo, or any other hard and durable kind. The Mango-wood, so extensively used in India, is not at all suitable for the purpose; it is so soft that a single rainy season is often sufficient to rot it entirely, besides which the white ants are certain to find it out and quickly destroy it. The present practice of taking a rough branch from a Mango-tree and sawing it into convenient lengths, ought to give way at once to the neater and handier squares of teak-wood, as when once firmly attached to the wood, it is impossible to remove the roots without seriously injuring them; the object must therefore be to select such wood as shall be lasting. Cleanliness, it has been said, is one of the principal points demanding attention in potting; the same applies equally to mounting on wood. No wood should be selected with holes or rough bark where insects can find shelter, to issue forth at night and prey upon the delicate parts of the plant. Afford no cover for such pests: hence reject all green wood, as it is a mistake to suppose that the plants are parasites and need the sap of the tree to nourish them: all they require is support, and that is as effectually provided in dry wood as in fresh.

In mounting on wood use small copper nails, which should be first driven into the board in the form of a square or triangle; then twist the end of a piece of thin copper wire round one of the nails; place a little fresh moss upon the wood and the root of the plant carefully spread out over that, covering it up with a little more moss, fixing it all firmly by passing the wire across from nail to nail. Brass wire is objectionable, because it is so liable to snap into pieces when rusty. When a plant is firmly established upon a piece of wood, the

wire may be withdrawn, and the moss picked carefully away from the roots during the rains, but renewed every spring as the plant shows signs of coming into bloom.

There are some strong-growing species which require tall upright posts, as *Renanthera coccinea*, *Vanda teres*, and large masses of *Vanda Roxburghii*, and *Aerides odoratum*; these all bear full exposure to the sun in Bengal, and need no moss or other protection for their roots.

Many Orchids flourish admirably in Bengal upon living trees, the Mango being perhaps the best, and once established they need but little attention except water in the hot weather. Vandas, Saccolabiums, Aerides, Cymbidiums, and some Dendrobes and Phalænopses will thrive well with such treatment, and in the North-Western Provinces the author has flowered several species year after year upon the lower branches of a shady Mango-tree, amongst which were *Dendrobiums Pierardii*, and *Macranthum*, *Phalænopsis grandiflora*, *Saccolabium Blumei*, and *Aerides odoratum*. The unquenchable curiosity of the crows is, however, the chief disadvantage to be combated, whenever plants are thus exposed to their inquisitive visits, as they invariably pull to pieces anything at all out of the common way, and although the green leaves of the Phalænopses escaped their attention, it was always otherwise as soon as the beautiful white flowers began to expand; the crows seemed to fancy they had no business on a Mango-tree, and always plucked them to pieces. They may be protected with wire-netting, or the crows may be overawed by hanging up the dead body of one of their race.

CHAPTER VIII.

GENERAL MANAGEMENT.—CLEANLINESS AND WATERING.

It is needless to remark that without care and personal attention the Horticulturist will never succeed in bringing any plant to perfection, and this applies with peculiar force to the cultivation of Orchids. They are often said to be troublesome plants to manage, but this is not at all true when a genuine interest is taken in them—indeed it would be most difficult to find any branch of this charming pursuit which so amply repays the cultivator for all his trouble and patience. In a tropical climate, where for so many months in the year the intense heat of the sun scorches up our favourite garden gems, and the heavy rains cause vegetation to become rampant and unmanageable, it is a real relief to turn to the conservatory and study the requirements of a class of plants which can at all times be kept well under control, whose lovely colours when in bloom and whose refreshing foliage will always supply that for which we look in vain to the Flower-garden. In no other order of plants is there so wide a field of study. Do we need variety of colour? where can be found such exquisitely pure and delicate tints—such marvellous contrasts—such intense hues? In shape, what flowers assume such eccentric forms? In fragrance, where can we find more delicious odours? And all this at the very season when most other plants are in a very uninteresting state. In fact, Orchids yield nothing in beauty, curiosity, or interest to any other members of the Vegetable Kingdom. Many varieties, in addition to their charming flowers, possess the valuable attraction of exquisitely variegated foliage, which renders them at all times objects of great interest. It is not easy to imagine a more glorious sight than a well stocked and cared for Orchid House in India during the months of April and May. Dendrobiums are then for the most part in full bloom, the pendent varieties seem like perfect showers of lovely blossom. *D. Pierardii*, the commonest of all, but by no means the least effective, with its abundant display of pale blush and lemon coloured flowers; *D. macrophyllum*, or more properly called *D. macranthum*, with its large deep-rose coloured petals and sepals, and a lip adorned with two intense purple spots; *D. Devonianum*, a strikingly beautiful plant, with flowers in which are combined white, deep purple and rich orange; *D. Falconeri*, another exquisite gem with its profusion of white blossoms tipped with purple; and the upright species, *D. densiflorum*, with drooping spikes of apricot tinted flowers; *D. formosum*, like a pure white lily with a rich yellow stain on its labellum, and many others which will be described in detail in another part of this volume. A little later, and the fragrance of some of the lovely Aerides will be a source of no little gratification, in addition to their beauty of form and colour. Phalænopsis, Vandas, Cypripediums, and many others, following each other in rapid succession, each and all furnishing abundant material for study and enjoyment. And what lover of the beauties of nature will grudge a little time and trouble with so rich a reward in prospect?

So much of the beauty of the plants depends upon the condition of the leaves, that too much care and attention cannot be bestowed upon them; more than this, unless the leaves are able to perform their proper functions, it is useless to expect the plants to grow in full health and vigour. This is especially necessary in the case of epiphytal Orchids, which

derive so much of their nourishment from atmospheric moisture imbibed by the aërial roots and elaborated by the leaves; it follows then, that if these pores be choked up with dust and dirt, the leaves are rendered useless for the latter purpose. In a tropical climate, where the plants are kept to a great extent in the open air, this is a point of much importance. Clouds of dust almost invariably accompany the hot winds of the summer months, and in Bengal the afternoon storms are almost always preceded by wind, bearing quantities of dust and forcing it into every cranny in the house. Hence the importance of frequently washing the leaves of the Orchids. This is best done with a soft sponge and soap and water. The ammonia in soap exercising a very beneficial effect, besides rendering it so much easier to remove all impurities from both the upper and under surfaces of the leaves. They must, however, be very carefully handled, as the surface of the leaf is very tender and liable to injury if rubbed too violently. This is a job that can be done easily by a little boy, but native gardeners are so fond of shirking their work, that unless they are constantly looked after, this very necessary part of their duty will be certainly neglected.

Another point to which it will be necessary to give the most careful attention will be the watering. In India it is a very common practice to water plants from earthenware "*gumlahs*" or tubs in which the water has perhaps been standing for several days, renewed from time to time by the "*Bheestie*" (water carrier) from the well or pond as it is emptied by the "*Mallee*" (gardener). After standing for a short time in these porous vessels—particularly if placed in a position where they are exposed to the wind—the water will become many degrees colder than the surrounding air, and to make use of this cold water for tender plants will be to give them a chill and check their growth. The water should be a degree or so warmer than the atmosphere—as it usually is when first drawn from a well—but the best plan is to store rain water in a cistern, adding a little hot water if it is found to be too cold when required for use.

It will be found by the use of warmed water that the plants will make much stronger and more vigorous growth. In England, the same result is attained by passing the hot water pipes through the cisterns which furnish the supply for watering purposes.

As to the best time for watering; when but little is required, and the plants need but once daily, it is preferable to water in the morning, before the sun becomes powerful, as then the plants are not likely to receive a chill about the roots from too much wet on a cold night. Then, as the days become hotter and the atmosphere drier, twice a day water will be required; the afternoon—just before sunset—will then be the best time to select for watering the plants, in addition to the morning supply. Direct mid-day watering should be avoided if possible, as there is always danger that drops may be left accidentally upon the leaves, and should the sun's rays be allowed to rest upon them, the drop acts like a glass lens, and an ugly burnt hole will be the certain consequence, which would detract greatly from the appearance of the plant. Whenever it is necessary to supply moisture in the middle of the day, it is always preferable to do so indirectly, that is, on the floors and walls, over the benches on which the plants stand, by the use of "*cus-cus*" tatties, and even by spreading tan upon the floors, and keeping it well wetted, the steam arising from which will greatly increase the humidity of the atmosphere. In the Upper Provinces of India, where the plants are kept under cloth in the hot weather, the danger from drops of water on the leaves is not so great, because there is no possibility of the sun's rays penetrating with sufficient force to damage the leaves. Here it will be found very beneficial at times to

syringe the cloth at noon, overhead, and thus create a light mist or spray within the house, the effects of which do not pass away for a considerable time.

Orchids which are grown upon wood will require much more water than those grown in baskets or pots, because the moisture is not retained so long about the roots; these will bear syringing twice or three times a day when growing, and even an occasional good soaking under water will be found useful when the wood has become very dry.

Overhead watering is very refreshing to all plants after a dry, hot day, and the afternoon is always the best time for this method. But the great danger to be apprehended is from an accumulation of water in the crowns of such plants as Vandas, Saccolabiums, and Cypripediums, or on very tender young shoots, and if not attended to, and the moisture removed with a sponge, the result may be that rot will ensue, and the plant be ruined.

For overhead watering, the syringe should have a very fine rose, and be used gently, as a heavy stream of water descending on the plants may injure and break leaves or shoots. But never syringe plants in bud or bloom.

The careful management of watering is one of the most important subjects that will occupy the personal attention of the cultivator of Orchids. Left to an ignorant gardener, whose indiscriminate use of the watering-pot at all times and seasons will surely bring about a most unsatisfactory state of things, no collection can ever be expected to thrive, or afford the anxiously hoped for bloom. Time, method, and quantity, must all be studied; whether much or little water should be afforded, whether to use the syringe or the watering-can, or whether to immerse the whole plant, will depend on the state of the atmosphere, as well as on the condition of the plant, and this must never be left to the caprice of a native. There is a reason for everything, and frequent visits to the Orchid House must be paid, or some very essential duty will probably be neglected, entailing results which may be most difficult to remedy. As a class, the author believes that the native gardeners of India are for the most part really interested in their work, and would make capital servants if they could only be persuaded that you know better than they do, and this is achieved in no other way than by constant personal supervision. They are so wedded to the customs of their predecessors, that to induce them to change their treatment is a most difficult matter; but that important point gained, everything else becomes easy. For this reason, it is always preferable to employ an intelligent new man for Orchids, rather than one who has had long experience in the flower-garden. Such a man can be trained to carry out any system of cultivation, and will not be biassed by prejudices in favour of his old-fashioned ideas. Explain your reasons for every course of treatment, and you will soon have a man upon whom you can thoroughly rely. The author's best gardeners were always those who knew nothing at all when they first entered his service.

CHAPTER IX.

TERRESTRIAL ORCHIDS.

A CONSIDERABLE section of this interesting Family of Orchids seems to require a stronger degree of nourishment for their support than is supplied in the moisture contained in the atmosphere. In nature they are found growing on the surface of the ground in rich vegetable soil, formed by the decayed leaves of the forest, and frequently in well shaded situations. These are again separable into two subdivisions—the evergreen and the deciduous. Amongst the former may be enumerated the curious genus Cypripedium, which have no fleshy bulbs, and require but a short season of rest; and of the deciduous, probably the best example is the Calanthe which forms stout bulbs, and needs a longer rest. Here again must be observed a different treatment in an artificial state of existence from that which seems to suit them best in nature. To grow them in the same kind of soil, of leaf mould or loam, would fail in most cases to induce them to bloom at all. In cultivation most of them certainly thrive best in Bengal, in a composition in which there is a large admixture of charcoal and vitrified brick, together with a little light vegetable soil. The pots used should be shallow, with three or four holes in the bottom as free outlet for excess of water; the layer of broken crocks as drainage, must be covered over with a little clean cocoa-nut fibre or moss, to prevent the soil from washing down amongst the crocks and stopping up the drainage. Over this is placed the potting material, in which the Orchid should be carefully planted, covering up the surface of the soil with a thin layer of fresh moss. With some species the bulbs are best entirely covered up, with others they should be above ground, the roots only being under the soil. Scrupulous cleanliness is a matter of as much importance to terrestrial Orchids as it is to Epiphytes; the pots and crocks ought always to be thoroughly washed before use, and re-potting every cold season is often desirable; this operation should be performed with care, and fresh compost always supplied whenever the plant is re-potted. After potting, water at first very sparingly until they commence to grow, when the quantity may be gradually increased; when in full vigour they require a great deal of moisture, and so long as none is retained about their roots in a stagnant condition they will do well; but as soon as it is observed that the water does not flow through the pot freely, it is a sign that the potting must be attended to, for the roots are usually thick and fleshy, and very liable to rot off if the soil is allowed to become sodden and sour. During their growing season, these plants will be greatly benefited by an occasional watering with weak liquid manure, but this must not be supplied too often.

Some of the terrestrial Orchids are remarkable for the extreme beauty of their foliage, to match which from any other order of the Vegetable Kingdom would be a matter of difficulty. Amongst these the Anæctochili are gems of the first water; they are found growing in the most humid situations under the shade of trees. They are mostly natives of the Indian Isles, where they obtain all the free circulation of air consequent on proximity to the sea; their leaves are usually almost rounded in form, and of the texture of the finest velvet; in colour sometimes the most brilliant metallic emerald green, and sometimes a rich warm brown or fine olive colour. In some varieties there is a broad band of a lighter hue

from the base to the tip of each leaf. Many in addition are covered all over with a fine network of shining gold or silver, which in sunlight sparkles with reflected lustre, each rib and vein brought into grand relief upon the mellow tone of the general surface of the leaf. In habit they differ materially from most Orchids in having thick fleshy rhizomes which spread along just under the surface of the ground, throwing their fine fibrous roots down into the earth, and the growing shoots which rise to the height of from two to six inches from the joints. They are all dwarfs and of compact growth; their flowers are not of great interest, and are usually removed when they appear. As these plants are valued entirely on account of their foliage, and as to bloom is always a severe effort on the part of a plant by which it is not unfrequently weakened, these delicate little gems may well be spared the exertion of flowering. The best material in which to grow such plants as Anæctochili, and the closely allied species, Macodes and Goodyera, is a compost of leaf mould and silver sand, with a considerable admixture of lumps of charcoal, the usual precautions being taken to secure perfect drainage. It is best to grow them under a bell glass, tilted on one side to furnish ventilation; or better still under small glass frames, such as are generally used for ferns, with a lid at the top to admit of fresh air. In watering care must be taken not to wet the leaves. Many species are deciduous, and die down to the roots in the cold weather. The pots should then be kept dry, as these plants need a couple of months' rest. Watering should then be recommenced very cautiously, and about the month of May they will again be in all their beauty. If kept confined in too close an atmosphere they are very liable to grow weedy, and perhaps even damp off altogether. No plants seem to require more attention and care in English hothouses, and in many collections they have been given up on account of constant failures. The same difficulty does not appear to attend their cultivation in India, possibly owing to the freer nature of the soil used, or the freer circulation of air they enjoy. Their most trying time is certainly the rains, and it is then that the advantage of a soil less retentive of moisture than loam or peat is apparent. Whenever a plant looks sickly it is always best to examine its roots at once, carefully washing them clean and potting in fresh soil; if rot has appeared in the rhizomes, the infected part should be cut away, and the wounds powdered with sulphur to arrest the bleeding. In potting, the growing points on the rhizomes should always be placed a little above the level of the edges of the pot, to afford them as much air and light as possible.

Some species of terrestrial Orchids may be grown with ease in the open border in Bengal. *Phajus albus*, for example, was planted by the author in Calcutta amongst the rocks of an artificial fernery under the shade of a tree, where the beautiful white flowers made their appearance in due course without the least special care or protection. Doubtless other varieties, such as Eulophia, Habenaria, and Zeuxine, might thrive equally well if grown out of doors in suitable situations.

Calanthe vestita in its several forms with their lovely sprays of snowy blossom, and *Limatodes rosea*, both thrive well in Bengal in large pots well drained and filled with a compost of leaf mould and well rotted cowdung, with a good admixture of broken brick. When travelling in the Khassia Hills, the author met with a very beautiful species of Calanthe bearing upright dense spikes of pale lavender colour, scented like a Hyacinth; the plants he secured did not, however, reach Calcutta alive.

Of American species there are several which would easily become acclimatized in India, as for example *Galeandra Baueri* (helmet-shaped anther), which is a native of Guiana, and *Galeandra Devoniana* from the Rio Negro, both of which have handsome flowers; both

require shade and abundance of moisture when growing, and a season of rest in the cold weather. Lycastes and Maxillarias will also succeed in Bengal with care, but in the hills *Lycaste Skinneri* with its endless varieties of colour would surely thrive to perfection. *Peristeria elata*, the famous Dove Orchid, with the same treatment as Calanthe, has flowered well in the Calcutta Botanical Gardens. This singular plant is worthy of a place in every collection; its leaves often reach the length of two to three feet, and have a noble appearance, whilst its pure white waxy flowers look exactly like a dove with outspread wings—hence its name in Spanish, "Spirito Santo." *Sobralia macrantha* is another handsome American terrestrial Orchid, having tall upright stems, with stiff, dark-green leaves; the flowers are large, deep crimson and purple in colour, and abundant, and in general appearance quite as striking as a Cattleya. All these plants need long rest, during which time water should be almost entirely withheld.

CHAPTER X.

ON PROPAGATION.

In their native forests Orchids doubtless propagate their species principally by seed, which carried by birds or wafted by the wind may be deposited upon the moss-clothed bark of some tree, and there, undisturbed, germinate, and in the course of years in turn become a flowering plant. The process is very slow indeed, and very uncertain, for of the many millions of seeds produced by a single plant, but very few accomplish the end of their existence; a thousand enemies prey upon them, or they may fall into uncongenial places and perish. And of those few which do germinate, how many again are sacrificed to the ravages of insects, or are choked in the struggle for existence with crowds of other struggling plants. Orchids grow but very slowly, a few inches, or a single additional bulb or shoot in a year. Hence they are proportionately rare, and in some instances there is positive danger of their entire extermination by reckless collectors who tear them from the trees by tens of thousands, packing them so closely together that but few survive the journey—to be exhibited only in rotting masses in the auction room and sold for a mere song.

Some species, however, propagate in a more rapid manner by pushing forth growing shoots and roots from the joints in the pseudobulb, as in many species of Dendrobium, or from an exhausted flower-spike, as in Phalænopsis and some Epidendrums.

Vandas, Aerides, Saccolabiums, &c., increase in size by the production of new growing shoots from the axils of the leaves, which in time become perfect plants with roots of their own.

Cattleyas, Oncidiums, Cœlogynes, Cymbidiums, and some Dendrobiums, produce new bulbs from the base of the old ones, sometimes upon a creeping rhizome, at other times direct.

Bulbous terrestrial Orchids increase much in the same manner, and in some instances from eyes underground like potatoes.

The object of the amateur cultivator should not be to increase the number of his specimens so much as to grow the plants he has into fine large masses—hence, division except for specific purposes is rather to be deprecated. Still there may be occasions when it is desirable to cut up a plant, although the rule holds good that it is preferable to have one fine plant than to possess a number of small ones. The larger the specimen, the stronger and more robust is the growth, and the better is it able to resist unfavourable conditions of climate—a matter of no little importance to those who have so many difficulties to contend against as the horticulturist in the tropics.

Many Orchids, as has already been remarked, increase very slowly, producing but a single additional bulb every year, whilst the old bulbs which have done flowering still remain plump and green, but showing no disposition whatever to start lateral shoots. Many Cattleyas, Dendrobiums, and Cœlogynes belong to this class, and may be operated upon in a very simple manner, so as to force them, if they are strong enough, into lateral growth from the back bulbs. This is done without disturbing the plant on its block or in its pot, by cutting through the rhizome between the bulbs, leaving not less than two bulbs

together undetached; the flow of sap through the roots of the old bulbs will then have no escape as before through the single shoot upon the latest-formed bulb, but must expend itself upon the production of an entirely new shoot close to the point where the dissection has taken place. A new series of roots will then be formed, and it is easy to imagine how a plant treated in this manner will increase in size with successive operations till it becomes a magnificent mass. This division of the rhizome is best effected in the cold season when the plant is at rest, and should be done in two operations, cutting half through the rhizome at the first, and after some interval entirely separating it.

When a Phalænopsis produces a young plant upon the end of an old flower-stalk, it should be watched until it begins to put forth roots. A little moss may then be tied to the stalk below the young plant, or it may be secured to a block in the usual manner, but without dividing it from its parent until its roots have become attached to the wood, when it may be safely removed.

All pendent Dendrobiums as well as some of the erect species, may be propagated by detaching a pseudobulb after it has done flowering and tying it with some fresh moss along a block of wood, watering carefully every day. New plants will then start from each joint, which quickly form roots, and after a single season will be large enough to pot or mount where they are intended to grow.

Bulbous Orchids such as Oncidiums, Cœlogynes, Cattleyas, Dendrobiums, &c., may be divided by cutting through the roots between the bulbs with a sharp knife, taking care that a growing shoot, as well as a portion of the roots, is attached to each piece, and potting separately. Orchids with woody stems and distichous leaves usually produce young shoots from the sides of their stem near its base. These, when large enough and furnished with roots of their own, may be detached without difficulty and potted; but should no such young shoots have appeared they may be artificially produced by cutting through the stem immediately below the top root, new growth will then probably appear from the lower portion of the stem. Vandas, Angræcums, and Renantheras belong to this class.

Some few Orchids, such as *Phajus albus*, or, as it is now called, *Thunia alba*, may be propagated by cuttings of their old pseudobulbs, in the same manner as Poinsettias or Dracænas, planting them in silver sand under a bell glass with a little bottom heat.

All young plants must be treated tenderly, watered carefully, and kept well shaded until they are fairly established.

CHAPTER XI.

ON HYBRIDIZATION.

We now approach the interesting subject of hybridization, to understand which it is necessary to be acquainted with the structural peculiarities of the flowers, and the mode of their propagation by seed. It is in this peculiarity of construction that the great difference lies between Orchids and all other members of the vegetable kingdom: no other plants possess the waxy column in which is situated the pollen and the stigma, or the eccentrically formed lower petal, known as the labellum or "lip;" upon these two characteristics the grand order is founded. Take as an illustration the flower of any Orchid, and examine its different parts in detail. It will be seen that the external portions are three in number—one dorsal and two lateral; these are the "sepals," and form what would ordinarily be called the "calyx" (in Cypripedium, however, there are but two sepals—one upper and one lower); when these are removed there will remain two lateral inner pieces, denominated "petals," and the portion of the flower opposite to the dorsal sepal, which is the labellum, ordinarily the most remarkable part of the flower, both in respect to shape, size, and colouring. The generative organs of the flower are combined in the "column," which is connected closely with the lip, rising like a club-shaped waxy mass above it, two stamens from the exterior portions of the lip, whilst the third is incorporated in the column. The base of the lip is usually developed into a spur or cavity, forming a receptacle of saccharine matter, and is termed the nectary; this in some Orchids is of great length, in others it is scarcely apparent. At the summit of the column is situated the little cells containing the pollen masses which are protected from exposure to the atmosphere by a close fitting, and slightly projecting cap called the "rostellum." The "pollinia," or pollen masses, are tiny globular, or slightly elongated waxy grains, to which are attached tiny viscid threads or "caudicles." In different genera the numbers of these pollen grains vary, some have but two, others four, eight or more. Under the rostellum is a small cavity, the surface of which is of a highly sticky nature, this is called the "stigmatic surface," impregnation being effected by bringing the pollen into contact with this viscid cavity to which it will adhere, thus fertilizing the ovules, and in course of time the column developes into the seed pod, which when ripe splits open longitudinally scattering its contents in the form of innumerable microscopic seeds. Mr. Darwin in his deeply interesting work on this subject, has estimated that a single spike of one of the British Orchids—Orchis mascula, produces not less than 186,300 seeds.

The fertilization of an Orchid-flower is thus effected without the slightest difficulty; in nature the operation is performed by the agency of moths, bees, and other insects who visit the blossoms and force themselves into the nectary in search of its treasury of sweets. Artificially, the whole process can be accomplished with the aid of a fine pointed pencil or penknife. It is in this manner that the pods are formed from the flowers of the Vanilla, which is cultivated to produce the article of commerce so much prized for its delicious perfume and flavour. An Orchid-flower may be fertilized with its own pollen, or with pollen taken from a flower of a different species; in the latter case when the operation is successful the offspring will be a hybrid, partaking of the nature of both parents in a greater

or less degree. For the operation of hybridizing, the first care must be to select only such plants as are of robust growth and in a condition of perfect health; the effort to produce seed is very exhausting, and plants not unfrequently perish from weakness in their attempt to perfect a seed pod. Unless, therefore, it is intended to raise plants from the seed, all pods which may have been produced by natural means should invariably be removed with a pair of scissors. It must also be remembered that when once a flower has been thus fertilized, its beauty will rapidly fade, whilst, had it remained untouched, it might have lasted for weeks unimpaired.

The impregnation having been effected a small label should be attached to the plant, bearing a record of the date and the species from which the pollen was taken.

The seed should be scattered lightly on the surface of living moss, or partially decayed wood, where it is not likely to be disturbed—about the roots of the parent plant is a very good place; they must not be covered over, and watering must be very gentle lest the seed be washed into the soil where it would certainly perish.

Mr. Williams tells us that some Orchids are a very long time in germinating, he has known them lie for twelve months before making their appearance. Mr. Scott of the Botanical Gardens, Calcutta, says, "they take from six weeks to upwards of three months in germinating." It is requisite, therefore, that the hybridizer be possessed of an unlimited stock of patience to watch carefully through a process that will take some years probably before results will be apparent.

After the seedlings have appeared like tiny shoots of moss, every precaution must be taken to save them from the ravages of insects, as these tender morsels will surely be the first to fall victims to such enemies. The pot in which they are growing should stand in a saucer filled with water, and a Bell glass over all would also be a considerable protection at night, ventilation being afforded in the daytime when there is less chance of damage.

In about two years the young plant may be sufficiently strong to bear removal and separate potting, but the roots must be treated with the most delicate handling.

So marvellous has been the success attending the experiments of a few persevering cultivators in England, with all the disadvantages of climate against them, that we are encouraged to hope for startling results, were tropical cultivators to try their success in raising Hybrid Orchids. Many of the varieties we have now from their natural habitats are probably the offspring of some combination which has been effected by insect agency—for example the numerous forms of the old favourite *Dendrobium nobile*, of *Cattleya Mossiæ*, of *Lycaste Skinneri*, and others, leading us to the belief that artificially a vast deal may be done in the production of beautiful varieties.

CHAPTER XII.

GEOGRAPHICAL DISTRIBUTION.

Orchids are not confined to any one locality, nor are they dependent upon any particular climatic conditions—representatives of the Order may be found in every country in the globe, excepting only the regions of the poles, and in countries where the atmosphere is absolutely devoid of moisture. Neither are they to be sought only at a limited altitude—we have them growing in dense forests near the sea shore, and we are told of some species which flourish on the highest mountains close to the limit of perpetual snow. In temperate climates, such as our own, or that of the southern portions of Canada, or, indeed, as far south as Spain and Italy, they all belong to terrestrial genera, but not the less are many of them plants of extreme beauty. In England we have nearly forty distinct species, which embellish our woods and meadows with their curious blossoms in the early summer months. These are known to our country cousins by familiar names which have been attached to them on account of their supposed resemblance to various natural objects, and in many instances this likeness is very remarkable. We have for example the Fly Orchis, the Bee Orchis, the Man Orchis, and others which are known to botanists by very different names—*Ophris mucifera*, *Ophris apifera*, and *Aceras anthropophora* to wit.

There are rarities, too, in this country, such as the *Cypripedium calceolus*, but all of them are ground Orchids. It is not until we approach the confines of the tropics that epiphytal species begin to appear, increasing in variety and number of individuals as the climate becomes hotter and moister. Tropical America teems with splendid genera, noted not less for the magnificence of their single flowers than for the profusion with which they are produced. But it is in the mountains that they love to make their homes, where often shrouded in fog and mist, refreshed with cool pure air, and at the same time strengthened with the bright rays of a tropical sun, Orchids reach their fullest perfection. Such a combination can never be imitated in temperate latitudes where the succession of dull days illuminated only by a wintry sun, struggling often in vain to penetrate the clouds, and then after all, as it were, with beams of only half power. Cultivators in the tropics have this element at any rate greatly in their favour—a sufficiency of sunlight. From the mountains of Mexico and Guatemala we have received most of the charming plants, which are known in England as Cool Orchids, comprising the Odontoglossums, Barkerias, and Epidendrums, as well as *Lycaste Skinneri*, with its infinite number of varieties; a few Oncidiums such as *O. ampliatum*, which has succeeded so well in Calcutta, *O. leucochilum* and *O. ornithorynchum*.

Of Cattleyas we have *C. citrina*, *C. Skinneri*, also the different species of Chysis and Stanhopea, as well as some fine Lælias, amongst which may be named *L. acuminata*, *L. albida*, *L. anceps*, *L. autumnalis*, *L. majalis*, and *L. superbiens*.

Humboldt speaks of the valleys of the Peruvian Andes as full of magnificent Orchids. It is from Peru that we receive the beautiful Masdevallias, which are amongst the most brilliant of cool Orchids. But it is on the eastern coast that they luxuriate in the humid forests of Brazil, on the sides of the Organ mountain, in Guayana, Venezuela, and the West Indian islands. From Brazil most of the finest Cattleyas are brought, foremost amongst

which stand the noble *C. labiata*, and *C. crispa*, both of which were known to us fifty years ago. *C. Aclandiæ*, and *C. marginata* dwarf in habit, beautiful in bloom; *C. guttata*, *C. Harrisonæ*, *C. Leopoldi*, &c., are all natives of Brazil; so is that exquisite little gem *Sophronitis grandiflora*. The bulk of the Oncidiums are likewise Brazilian, as are also the Miltonias, and several Lælias, such as *L. elegans*, *L. cinnabarina*, and *L. purpurata*.

Crossing the Atlantic we come to Cape Colony, where a few good Orchids have been found, mostly terrestrial, and amongst which is pre-eminent *Disa grandiflora*, a splendid plant that would do honour to any collection, its bright scarlet flowers being often four inches in diameter. South Africa is one of the most promising of the still unexplored regions, if we may believe Mr. Plant, as quoted in Mr. Williams's most useful Manual, page 283, he says, "The terrestrial Orchids are numerous and very beautiful. In my opinion there are many here but little inferior to the most showy of the epiphitous kinds. Fancy a plant with the general characters of an Ophris producing a spike of bloom as large and as thickly set as those of *Saccolabium guttatum*, often indeed measuring two feet in length, of a bright salmon colour, intermixed with as bright a yellow. Another with plaited foliage and a nodding head of some twenty bright yellow blossoms having a deep stain of crimson on the cucullate lip in the manner and of the size of a Dendrobium." This gentleman did not live to return to England, or we might have known more of the botanical riches of South Africa. So also do other African travellers bear testimony to the luxuriant vegetation and splendid parasitical plants—doubtless Orchids, concerning which we long to know more.

The islands adjacent to the east coast of Africa, Madagascar, Mauritius and Bourbon, are celebrated for the extreme beauty of their ferns, as well as an abundance of Orchid life, but with the exception of the Angræcums, there is very little to interest a general grower, except botanically, their flowers being small and inconspicuous.

We now pass over to the eastern region of Orchids, rich as to the number of genera and species, amongst which are many of the noblest plants that can grace any collection. In this particular Western India is by no means so highly favoured. On the Bombay side there are but a few species worthy of the amateur's attention, *Aerides maculosum* and a few Dendrobes being among the best. The same remark applies equally to the mountains of Central India, the Neilgherries and Parisnath ranges. From the island of Ceylon, however, we have several of great beauty, particularly a few species of the exquisite Anæctochilus, several Cœlogynes, Calanthes, Cymbidiums and Dendrobiums, including the beautiful *D. McCarthiæ* and *D. sanguinolentum*; a few Vandas and Saccolabiums, as well as numerous less interesting genera, such as Erias, Cirrhopetalums, Eulophias, &c.

The Himalayas, to the westward of Nepaul, are by no means abundantly supplied with Orchids—the climate does not appear to be sufficiently humid—although in the neighbourhood of Almorah may be found several epiphytal species; it seems to be their westward limit, for in the hills about Mussoorie and Simla there are scarcely any at all. Nepaul is a closed region to the European explorer, almost as unknown as the interior of China Proper, but in the moist valleys of the Terai, at the foot of the Himalayas, there are vast numbers of valuable plants of which we may hope to know more some day; it is probable, however, that they will be found to resemble in character the Orchids of Sikkim which are well known. Darjeeling and the valley of Teesta have furnished us with a considerable number of favourite plants, foremost among which is the rare *Vanda Cathcartii* which has so seldom been seen in flower in English hothouses. This valuable plant was originally found growing on old trees, densely shaded, where the atmosphere was hot and humid, apparently by no means in the

most suitable localities for its requirements, for we are told by Mr. Scott, the energetic curator of the Calcutta Botanical Gardens, that since these hills have been partially cleared for Cinchona cultivation this Vanda has rapidly increased, probably on account of its enjoying more sunlight and a freer circulation of air, a fact which Orchid cultivators will do well to note, in proof that it is not always where they are found that Orchids enjoy the most favourable conditions for their perfect development. In this district will be found many fine Dendrobiums, such as *chrysanthum, Farmeri, Falconeri, transparens, nobile, densiflorum, Paxtoni, Moschatum, primulinum,* and others, mostly at some elevation above the sea. *Cœlogynes cristata, flaccida, ochracea,* and *Pleione lazenaria* are also natives of the hills of Sikkim and Bhootan; so also are *Cymbidiums eburneum, giganteum, elegans,* &c.; *Saccolabiums guttatum* and *curvifolium; Vandas cristata* and *Roxburghii,* which latter spreads in abundance all over the plains of Bengal and Assam; *Aerides affine* and *roseum,* and the interesting little *Phalænopsis Mannii;* whilst of terrestrial species there are several varieties of Phaius, Calanthe, and the little *Anæctochilus Roxburghii.*

The valley of the Brahmapootra contains very many rich treasures, more especially towards the eastern frontier, and the hills to the south of Assam are teeming with handsome varieties. In the plains are found *Aerides Fieldingii, odoratum, affine,* and *roseum; Dendrobiums Pierardii, transparens, aggregatum* and *Jenkinsii; Vanda teres* in abundance; *Cymbidium Mastersii; Camarotis purpurea* and *Saccolabium guttatum;* but in the only partially known Naga and Jynteah, and the thoroughly explored Khassia and Garrow hills, it would be impossible to furnish a list of the species, they are so numerous. Here very locally is found *Vanda cærulea,* the queen of the genus, with its delicate lavender flowers and shining green foliage, becoming now rather scarce. *Dendrobiums Devonianum, formosum, Cambridgeanum, densiflorum, Farmeri, heterocarpum,* &c., abound, and also *Cypripediums insigne, hirsutissimum,* and *venustum,* as well as Calanthes and Phaius, and of all other eastern genera, except perhaps Phalænopsis, there are many representatives. Silhet and Cachar have also a very considerable supply, which increase in importance and materially change in character as we descend towards the Arracan and Burmese hills, from whence, owing to the labours of Colonel Benson, we have lately received so many novelties. Here is the habitat of *Vandas Bensoni* and *cærulescens; Saccolabium giganteum; Vanda gigantea; Dendrobiums Bensoniæ, crassinode, chrysotoxum, formosum, crystallinum, ochraceum* and *cretaceum,* and *Thunia Bensoniæ.* Travelling onwards through Martaban and the Indian peninsula, a vast number of rich species will be met with. This district has been well explored by the Rev. C. Parish, who has there discovered many rare and beautiful Orchids—as for example, *Cypripediums concolor, Parishii,* and *niveum; Dendrobiums Dalhouseanum* (true), *albosanguineum,* and *Parishii; Phalænopsis cornucervi; Lowii,* and *Parishii; Cœlogyne Parishii; Calanthe vestita* and *Limatodes rosea.*

The Indian archipelago next claims our attention. From the island of Amboyna came the first news to the civilized world of the wonders of tropical Orchidaceous epiphytes, as it was here that Rumphius, the celebrated Dutch botanist, found the glorious *Phalænopsis amabilis* about 1750. Java is full of Orchids, many of which are very handsome, as for example, the rare *Vanda insignis,* as well as *V. tricolor* and *V. suavis; Saccolabiums miniatum* and *retusum; Grammatophyllums scriptum* and *speciosum; Aerides suavissimum* and *virens; Dendrobiums tortile* and *secundum,* and several charming Anæctochili and other terrestrial Orchids. Borneo too supplies us with very many treasures, among which are *Vanda Lowii,* with its pendent raceme of flowers, sometimes ten feet long, bearing two distinct kinds of bloom; *Cypripediums Lowii, Stonei,* and *Hookeræ; Phalænopsis grandiflora,* and many others.

From the most northern group of this archipelago—the Philippines, we have many Orchids of unsurpassed excellence, chief amongst which is *Phalænopsis Schilleriana*, remarkable alike for the beauty of its foliage and the exquisite delicacy of its splendid flowers. Here also is found *Dendrobium macranthum*, almost at the head of that genus, and *Cypripedium lævigatum*, with its extraordinary elongated and twisted petals. *Vandas Batemanii* and *violacea* are also natives of these islands, and so is *Aerides quinquevulnerum*. It may almost be said that the Philippines can boast of possessing the choicest species of all the richest genera of eastern Orchids.

Japan has but few members of this Order, and we do not know much about the flora of Southern China and the island of Formosa; but doubtless many interesting species will at some future day be found there; the same may be said of New Guinea. The northern portions of Australia have furnished us with a few good Dendrobiums, such as *Hillii*, *Tattonianum*, and *bigibbum*. And thus we complete our tour round the globe in search of Orchids.

CHAPTER XIII.

ON COLLECTING AND PACKING.

In the preceding chapter an attempt has been made to glance in the most cursory manner through the districts where Orchids are to be met with growing in a natural state; we have now to consider the most likely positions in which they should be looked for, how to remove them, and how they should be packed to travel.

The task of collecting Orchids is by no means an easy one; it must not be supposed that in a tropical forest the trees are loaded with the plants required, and that nothing has to be done beyond their collection and despatch. The very first lesson the would-be collector has to learn is to know the species he wants, and where to look for them; for every single plant worth taking away hundreds may be found of no interest at all, save to the botanist, the intrinsic value of which would not amount to the cost of carriage to the nearest station. In the forests of Sikkim or Assam there are thousands of Erias, Pholidotas, and Bolbophyllums, none of which would be worth the trouble and expense of taking away, and would only occupy the room which should be more worthily utilized; half a dozen really good plants would be worth as many cartloads of rubbish. It is a very general rule that these good plants grow in the most inaccessible places; on the topmost boughs of lofty trees—near the light—where they enjoy a freer circulation of air than is afforded in the denser parts of the forest; or possibly clinging to the rocks overhanging some waterfall. The collector should be able to recognise his desiderata at a distance, so as to save the time which would be spent in climbing. A preliminary exploration of the district is always advisable whenever practicable, so that when coolies with their baskets are taken down no time may be wasted in searching for the plants. The collector should have with him a saw and axe, with which to cut off branches of trees, a strong bladed knife, to remove the roots from the bark, a trowel or spud, for terrestrial species, and string with which to tie up their roots in moss. The best season for removing Orchids from their habitats is the cold weather, when the plants are at rest, which in India would be from November to March; there is always risk in disturbing them when once the sap has commenced to flow. In removing them from the trees care must be taken to injure the roots as little as possible, and to preserve the growing shoots from being bruised, as the value of the plant depends mainly on the condition of its stem or crown; the larger the specimen, the more likely will it be to carry well.

Terrestrial species should be dug up carefully, and the earth shaken from the roots, which should then be enveloped in live moss and tied up, to keep them moist and free from exposure to the air. A true lover of nature will never strip a locality of its treasures; he will remove a portion, but never the whole—he will be loth to exterminate a species from its home; some will always be left to carry on the work of reproduction, and such a feeling as a desire to prevent anyone else from finding a rare species, would above all things never cause him to destroy what he could not carry away. Such an act would be Vandalism in the highest degree.

For an inland journey, the best plan is to pack the plants in wicker baskets, covering over the top with rough matting; the interstices between the plants may be filled with moss,

as that material is invaluable in the plains for mounting the plants, and it is not to be bought for love or money in any of the large cities of India. On no account should the plants be watered when in transit, and if despatched by river steamer it is advisable to mark the packages "To be kept dry and cool;" or possibly, with the very best intentions, some one on board may kindly give them a watering, and do no end of damage. The author's personal experience has taught him the necessity of this caution.

If the collection is intended for growth in India, the plants should be unpacked with as little delay as possible, and spread out on the floor of a dry shed, where no sunlight can reach them; each plant must then be examined, and cleared of all dead leaves and roots, broken stems and bulbs cut away, insects (if any) removed, and the plant potted or mounted as it is intended to be grown, giving water sparingly at first, until the new growth has fairly started.

If, however, the plants are for export to Europe, or across the sea, more care must be taken in the packing; there must be no extraneous moisture about them, and if moss is used, it should be first thoroughly dried in the sun. Most Orchids will carry well close packed—that is, in ordinary wooden boxes. They should not be too large, as accidental moisture in a box causes mildew and rot, which in a long voyage will utterly ruin the whole contents; this danger is proportionately reduced with smaller boxes. For long journeys it is of great importance to select the most favourable season; that will be when the plants are in a completely dormant state, and at the same time the probable state of the climate when the boxes arrive must be taken into consideration. Frost is their worst enemy, and will destroy the contents of a box in a single night. The plants should not therefore be despatched so as to arrive in England at a period when frost is probable, perhaps early November or mid February would be the most favourable times for the despatch of Orchids from India; but no rule can be laid down, because it is possible that the weather may be very severe in December, or in March; the chances, however, are much more in favour of mild weather then, than in January or February. Should their despatch be delayed, it is not improbable that the plants may start into growth in the boxes, in which case the result would be shoots weak from want of air and light, and on exposure they would probably rot and drop off, to the ruin of the plant as a specimen.

In packing, then, the plants must be dry, and the roots nicely tied up in dry moss; they must not be pressed into the boxes too tightly, nor on the other hand should there be a possibility of the plants shifting about and bruising each other. Orchids with long pseudobulbs, such as Dendrobiums, should have their roots fixed at the ends of long boxes, and their stems coiled in the middle, so far as this can be done without breaking them. Smaller plants are best packed in layers; each tier being securely fastened down by battens across the inside of the box, and an intermediate layer of dry shavings, or, what is better, dry cocoa-nut fibre; then another tier of plants, more fibre and battens, and so on until the box is filled. This plan may be safely followed with Cœlogynes, Dendrobiums, Vandas, Saccolabiums, and Aerides, when completely at rest. More delicate plants, such as Phalænopses, Cypripediums, Anæctochili, &c., should be attached securely to partition boards, made to slide into the packing-case, like so many trays in a cabinet, and the whole fastened in such a manner as to prevent the possibility of anything breaking adrift. It is often advisable to establish valuable plants on little flat boards previous to sending them to Europe; when this is done the wood should be firmly fixed to the sides of the packing-case. Closed boxes of plants should never be taken on the deck, or in a boat on board the steamer, nor should they be put down at the

bottom of the hold, nor should they be stowed away near the engines. It is always best to arrange to have them taken as cabin freight: there will then be no danger of their being boiled from contact with heated and sweating cargo, nor baked by the engine fires, nor soused with sea-water when washing decks every morning, nor damaged with rain. It is better to pay a little extra freight rather than expose the plants to such a series of disasters. If it is necessary to despatch Orchids when in a growing state, it will be found best to pack them in Wardian cases, fastening them securely to prevent damage; the bottoms of such cases should be raised some safe height by legs or blocks, so that sea-water shall not penetrate.

For the receipt of American plants in India, the summer is the best time, so that the plants may be able to get their growth completed before the weather becomes cold. After unpacking, they should be laid on dry moss in a dark shed, admitting light and supplying moisture very gradually. After awhile they may be potted or mounted, and removed to the Orchid house as soon as they have become fairly established.

CHAPTER XIV.

INSECT ENEMIES.

The insect enemies of Orchids are numerous—in Bengal especially so, but in the north-western provinces of India they are by no means so troublesome. It is experience alone that teaches us what insects are our greatest plagues; the author is obliged therefore to confine his remarks to those which are to be provided against in India. No doubt in other localities there will be found other enemies; in America or Cape Colony an entirely different kind of insect may be the worst pest. Experience which has been dearly purchased in another part of the world, may, however, be of considerable value elsewhere, modified and adapted to meet different cases.

It may be accepted as a general rule that all insects are more or less injurious to Orchids; even the most harmless will soil and sully the purity of the flower. Some, however, such as crickets, cockroaches, scale, thrips, ants, and the red spider, are directly injurious. War must be declared against these "to the knife," spare none, kill them whenever and wherever they are found in proximity to the Orchid house—use every artifice to entrap them. Think of the anxious interest with which the development of a magnificent flower shoot has been watched as it lengthens day after day, promising ere long to furnish a rich reward for the time and patience which have been expended on it! Think of the disappointment which would be felt at seeing the plant one fine morning shorn of its treasure, the lovely shoot having been cut through in a single night by a cricket, and a whole year must elapse before that plant can flower again! When an accident like this occurs, not a stone must be left unturned to discover the retreat of the enemy, which will probably be found snugly ensconced amongst the broken bricks in some neighbouring pot. Crickets and cockroaches feed upon the tender shoots and leaves, and the delicate points of the roots, doing incalculable mischief if they once obtain a lodgment amongst the Orchids. When it is suspected that any of these insects are in a pot, the whole should be immersed in water, when they will invariably come to the surface. Traps may be laid for them at night of smooth glass pans, with a little treacle and water at the bottom of them, into which the insect will venture and be unable to escape up the slippery surface of the glass; the principal danger of using any such bait would, however, be the possibility of its attracting insects from outside, and the damage they might effect before falling into the trap laid for them. A diligent examination of the plants at night by candlelight is a far more effectual mode of discovering them, when they can be readily caught and destroyed. A sharp, strong needle fixed at the end of a little stick makes a capital harpoon for transfixing them instantly before they can escape.

The white scale and mealy bug infest the under surfaces of the leaves, and attaching themselves firmly there, do serious injury to the plants. To destroy these the Orchid should be carefully sponged with warm water and soap. Mr. Scott's formula is, "to a quart of water add two ounces of soft soap, a quarter of an ounce of tobacco, and a dessertspoonful of turpentine, then stir well together, and after forty-eight hours' infusion strain and bottle for use." This is to be applied to the parts affected, and after a day or two carefully sponged off.

Another cultivator objects to the use of soap and turpentine as liable to injure the delicate leaves of the plant, particularly if it should get into the crown of the plant; he recommends a mixture of one ounce each of bitter aloes and tobacco in a gallon of water, which is said to be quite as effectual a cure as the former, and not in the least likely to burn the plant. If the Orchids are kept constantly clean, these insects will not be able to establish themselves, and prevention is always better than cure. Fresh air, sufficient light, and perfect cleanliness are the best preventions against all such enemies.

The red spider is another great pest in the Orchid house, boring tiny holes in the leaves, through which it sucks the juices of the plant, causing ugly spots to appear, which spread until the whole leaf becomes discoloured, and not unfrequently results in the death of the plant by exhaustion. There again cleanliness is the best preventive, but if the insect has made its appearance it is best destroyed by fumigation with tobacco smoke. Some cultivators, however, recommend the moderate use of sulphur.

Wood lice are also very destructive; they are usually caught by dividing a potato in half, cutting away a portion of the inside and placing them with the cut half downwards on the soil of the Orchid pots; the insects will always congregate in such a cool place, and should be collected every morning and destroyed. Mr. Williams remarks that toads are very useful in an Orchid house, as they do the plants no harm and feed upon their insect enemies.

Ants are not directly injurious to Orchids, but they are in the habit of "making tracks" over plants and paths, leaving dirt and soil behind them, building their nests in the pots and choking up the drainage, invading the flowers and sipping their sweets, and so spoiling their beauty; they must therefore be numbered amongst the enemies, and be driven away to other hunting grounds. Ants evince the utmost dislike to turmeric, a little of which in the form of powder sprinkled a few times about their haunts will be a notice to quit; they will at once understand, and take the hint. White ants, so-called, do not belong to the family of ants at all, but to an entire distinct tribe; they have the reputation of being extremely destructive to vegetable life, but in this they have been seriously libelled. There was quite a controversy in the newspapers of India a few years ago as to whether these insects (*Termes fatalis*) were in the habit of attacking living plants at all; regarding this, the Rev. T. Firminger, in his invaluable work on Indian gardening, says, "No vermin have a worse reputation for mischief than the white ant, yet I believe it is almost exclusively for the injury it does within the house that it deserves it . . . . living plants are altogether secure from their attack. Complaints, it is true, are often made of cuttings having been destroyed by them, but I make no doubt but that in all cases the cuttings have died first, and the white ants have only devoured them afterwards."

Still, in the Orchid house white ants may do a vast deal of mischief, for they will attack the dry blocks upon which the Orchids are fastened, and the wooden baskets in which some may be grown, and in a very short time completely destroy them; they also frequently get into the pots and fill up the drainage with soil. It is almost impossible to exterminate them, their attacks are so rapid and in such vast numbers; but whenever they are detected ascending a post or emerging from the ground, they should be destroyed by pouring over them a kettleful of scalding water. Wood soaked in creosote is said to be avoided by white ants, but it is questionable if it would be quite harmless to the roots of delicate Orchids.

Besides their insect enemies, Orchids are liable to suffer severely from the attacks of small molluscs, such as slugs and snails, which feed most voraciously upon all the softer

parts of the plant. Some are introduced in the water when taken from tanks, and find a refuge in the cocoa-nut fibre sometimes used in potting, whilst it has been found that pots in which no fibre was used were entirely free; it was for this reason that the use of cocoa-nut dust and fibre was relinquished in the Calcutta Botanical Gardens, the result being the entire disappearance of this serious pest. The approach of slugs and snails from the ground may be prevented by sprinkling quicklime under the stands upon which the plants are arranged. The attacks of these unwelcome visitors are usually made in the rains, when the soil is full of moisture, and the atmosphere thoroughly saturated; in the hot and cold weather they scarcely ever appear.

CHAPTER XV.

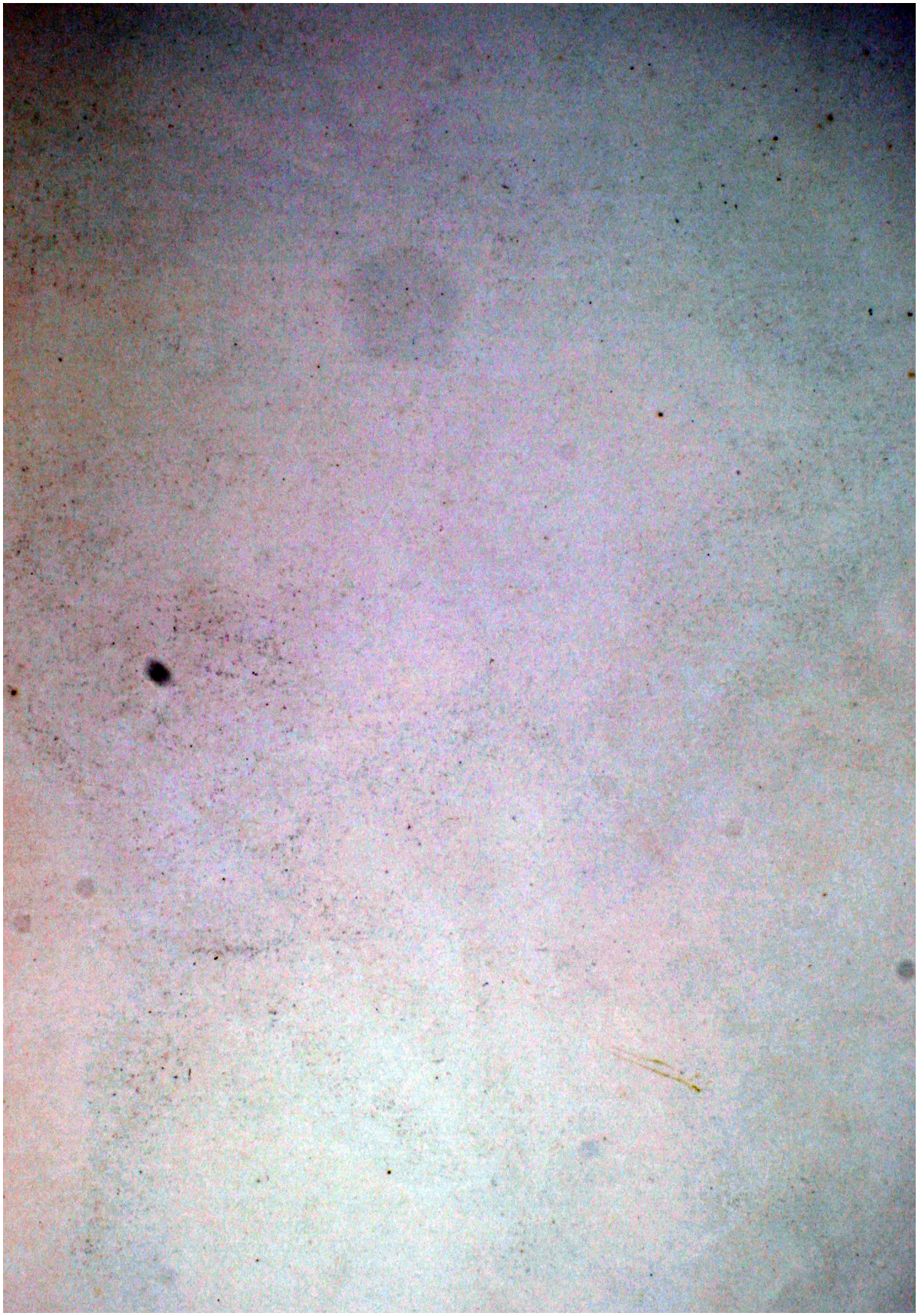
THE DISEASES OF ORCHIDS.

Orchids, to give perfect satisfaction as regards appearance, and to produce blossom well, must be in the enjoyment of robust health. When any element of their condition becomes unfavourable, if moisture is excessive, the soil sour or stale, or the atmosphere too dry or hot, the effects of such a condition at once make themselves manifest in the appearance of the plants; the leaves become scorched and crack, and the bulbs shrivel; or, on the other hand, the growth may be too rapid, and the plants become drawn out and weedy, and ultimately perish from exhaustion. Careful attention to the rules laid down for their management is therefore necessary, to supply the conditions most favourable for their perfection; care in watering, in shade and sunlight, in growth and rest, in cleanliness and ventilation, but with all care it sometimes happens that disease breaks out, which if not checked in time will completely destroy the plant. The most serious diseases to which Orchids are subject are the "rot" and the "spot." The former complaint is one to which newly imported plants are very subject, being very often engendered by moisture confined in a close box. It is almost always caused by wet dropping upon the growing shoots or the crowns, and resting there until it sinks into the very heart of the bulb, forming a mass of rotten watery matter, which when gently pressed exudes a putrid fluid. The outside of the bulb will generally appear soft and discoloured, and this condition will spread from bulb to bulb until the whole plant is ruined, unless the infected portion is cut away entirely, and the wound dusted with sulphur, to prevent bleeding. Plants with thick fleshy bulbs, such as Cattleyas, Cœlogynes, &c., are particularly subject to this disease, for which amputation or a free use of the knife is the only cure. The plant should then be kept as dry as possible, until it is ascertained that the "rot" has been entirely eradicated. This disease is mostly to be feared in the rains, and is best prevented by perfect drainage, and a free circulation of air, but out of a cold draught.

The "spot" is induced by the same unhealthy conditions as "rot," but more usually from a defect in the potting, as, for example, stale earth or moss, decayed wood, decomposed matter of any description about the roots, and above all from supplying them with too much moisture during their season of rest. The disease appears in the leaves, which become spoiled by blotches, which rapidly spread and increase. Although it is generally now admitted that an infected plant will not communicate the disease to its neighbours, there are some cultivators who hold the opinion that the "spot" is contagious, and that if not checked it will spread through the whole collection; it is therefore better to remove an unhealthy plant away from the rest for many reasons apart from this possible danger. It will be less likely to be overlooked, and it can be subjected to special treatment in the matter of light and watering, particularly when it is desirable to keep it drier than the other healthy plants, which is very necessary in cases of "spot." Phalænopses and epiphytal Orchids are most liable to suffer in this manner, and when the disease makes its appearance the plant should be taken out of its pot or basket, the roots carefully examined, removing all decayed parts, washing the whole plant and re-setting it in fresh materials, affording water, but sparingly at first, until new

vigorous growth commences, when it may resume its place in the collection, and be treated like the rest. By these means plants will soon recover from the effects of disease.

In the chapter on Watering it has been pointed out that the direct rays of the sun falling upon the leaves of Orchids, upon which were standing drops of water, will not unfrequently burn a hole through the tissues and permanently disfigure the plant. This will lead the cultivator to pay particular attention to the watering, and subsequently necessary sponging, whenever the plants are placed in such a situation that sunlight may possibly fall upon them. Direct sunlight in the early morning is undoubtedly beneficial, so is overhead watering, but both must not be enjoyed by the plants at one and the same time.



F.W. Burbidge, del. et lith.

V. Brooks Day & Son, Imp.

CATTLEYA EXONIENSIS.

Plate I.

CATTLEYA EXONIENSIS.

Hybrid: Cattleya Mossiæ—Lælia purpurata.

An apology is almost necessary for giving precedence to a hybrid, and strict botanists might doubtless be inclined to demur at any mention whatever of such questionable characters in a scientific work. Doubtless such productions tend to the confusion of species and the utter mystification of the student; but facts are stubborn things, and hybrids are, some of them, truly magnificent facts. From a cultivator's point of view, any process by which a plant is improved, a fruit increased in size or flavour, or a flower enhanced in delicacy or depth of tint, is a step in the right direction; and the splendid specimen figured from a plant which bloomed in the nurseries of Messrs. James Veitch and Sons, of Chelsea, in December last, is one of the finest varieties of this genus that has yet been seen. It has been raised by the impregnation of *Cattleya Mossiæ* with the pollen of *Lælia purpurata*, and has inherited all the best points of both parents. The sepals and petals are usually soft lilac, but in the specimen before us they are deepened into a rosy-pink; the labellum is remarkably handsome, deep crimson in colour, margined with white; the interior of the lip is golden orange, sepals and petals all beautifully crisped; altogether it would be very difficult to imagine a more splendid flower.

It is worthy of remark that the perfectly intermediate character of this plant is strongly apparent in its pollinia. The distinction between the two genera, Cattleya and Lælia, consists in the number of their pollen masses, there being eight—four upper and four lower—in the latter genus, whilst in Cattleya there are only four upper. In the hybrid species under notice the four upper pollinia are perfect as in both parents, and at the same time there has been an effort to produce the four lower, which are only partially developed, as shown in the plate.

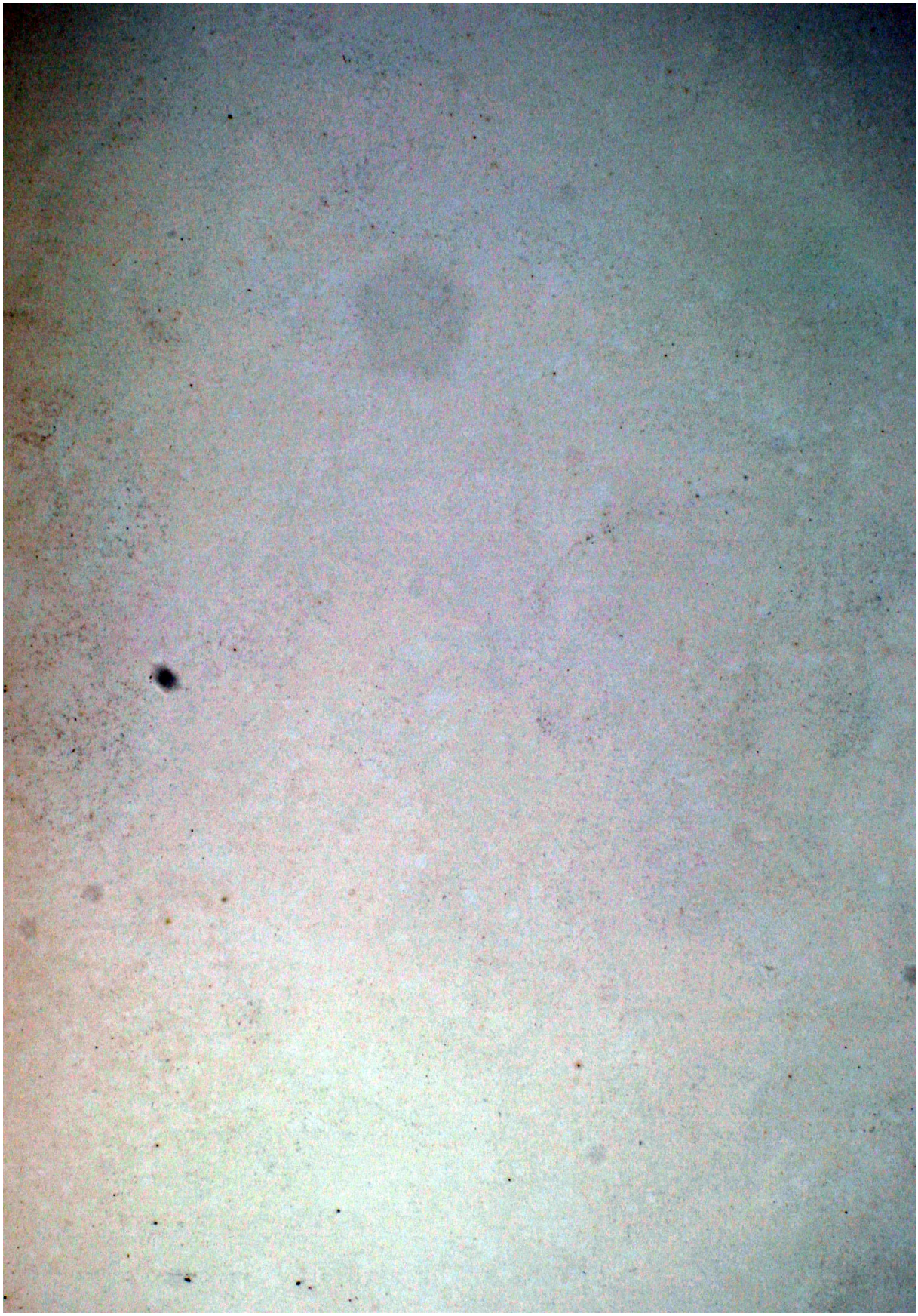
At the present time we are in possession of eleven distinct hybrid Cattleyas, all of which are of considerable excellence. They may be enumerated as follows:—

1. *Cattleya hybrida maculata.*—A cross between *Cattleyas guttata* and *intermedia.*
2. *Cattleya Brabantiæ.*—*Cattleyas Loddigesii* and *Aclandiæ*, both of which require greater heat than most of the genus; this charming hybrid is, therefore, one of the best for cultivation in warm climates.
3. *Cattleya Manglesii.*—*Cattleyas Mossiæ* and *Loddigesii.*
4. *Cattleya quinquecolor.*—*Cattleyas Aclandiæ* and *Forbesii.* This plant combines the green colour of the sepals and petals of *C. Forbesii* with the chocolate spots of *C. Aclandiæ;* the labellum is white, stained with yellow and streaked with crimson.
5. *Cattleya Pilcheri.*—*Cattleya crispa* and *Lælia Perinii.* By some this is described as a Lælia; sepals and petals rose-coloured, labellum purple and white. Of this there is a variety called "*alba.*"
6. *Cattleya Dominiana.*—*Cattleyas Maxima* and *Amethystina.* Sepals and petals white,

shaded delicately with blush; labellum purple, margined with white, and stained in the interior with deep yellow. Another variety of this hybrid, termed "alba," has a white lip, blotched with lavender.

7. *Cattleya Devoniensis.*—*Cattleyas crispa* and *guttata*. Sepals and petals white, tipped with rose colour; labellum dark crimson.
8. *Cattleya hybrida.*—*Cattleyas granulosa* and *Harrisoniæ*.
9. *Cattleya Exoniensis.*—*Cattleya Mossiæ* and *Lælia purpurati*, described above.
10. *Cattleya Sidniana.*—*Cattleyas crispa* and *granulosa*.
11. *Cattleya Fausta.*—*Cattleyas Exoniensis* and *Loddigesii*.

For the great majority of the above splendid plants, amongst which is the subject figured, we are indebted to the labours of Mr. Dominy, who for so many years has been engaged with Messrs. Veitch and Sons, at Exeter and Chelsea.



F.W. Burbidge del et lith

V. Brooks Day & Son, Imp.

Paul. Walker fy. - Spore f 2.50

DENDROBIUM WARDIANUM.

Plate II.

DENDROBIUM WARDIANUM.

This magnificent species is a native of Assam; it is still very scarce and valuable. It unfolded its charming flowers for the first time in this country in the collection of Thomas Ward, Esq., of Southampton, in compliment to whom it has been named. Its habit is pendulous and its fine vigorous stems are strongly knotted, growing frequently to the length of three feet, and bearing in April and May flowers of great beauty, in pairs and sometimes three together. The petals and sepals are white tipped with rosy magenta, and the labellum rich orange margined with white and ornamented with two deep crimson spots. The flowers measure three inches across, and continue a long time in beauty.

It is best grown in baskets or on a block of wood, with a good supply of moss; and during its growing season care must be taken lest it receive any check, as its habit is almost invariably to resume growth from the base of the stem, forming a new shoot rather than completing that already commenced, and as a natural consequence both will be weak. The plate is taken from a drawing by the late Mrs. Ellis, in the possession of J. C. Stevens, Esq., who kindly lent it for the purpose.

Belonging to this group of pendulous Dendrobes the following may be described, all requiring the same treatment and all worthy of a place in any good collection.

Dendrobium chrysanthum (golden).—A native of Northern India. Stems often four to five feet in length. It blooms in May and June. The flowers are bright yellow, bearing on the labellum two deep red spots. The profusion with which this plant flowers will always render it a favourite. It is common in the Calcutta gardens.

Dendrobium Devonianum (in compliment to the late Duke of Devonshire).—A native of the Khassia Hills; one of the most lovely of pendulous Orchids; stems slender, from four to five feet in length; leaves narrow, deciduous; flowers white, tipped with purple, petals having a delicate rosy tinge; labellum broad, deeply fringed, white, edged with rich purple, and having two brilliant orange blotches or spots near the base. This plant is found growing at an elevation of 3000 to 4000 feet above the sea, and may be considered a semi-tropical species. Being a native of the Khassia Hills, where the rainfall is almost double that of any other locality in the world, it should be watered very freely whilst making its growth, but perfect drainage is also indispensable.

Dendrobium Falconeri (after Dr. Hugh Falconer).—A native of Darjeeling and Bhootan, where it grows at a height of 4000 feet. Stems branched, delicate, and slender, and knotted at the joints, four feet in length; flowers white, tipped with purple; labellum white, with a rich purple blotch at the base, surrounded with bright golden margin. Flowers in April and May.

Dendrobium lituiflorum (trumpet-shaped, from the Latin, *Lituus*, a clarion).—A native of India. Flowers large, dark purple in colour; labellum white, with purple margin, curved like a trumpet.

Dendrobium McCarthiæ (in compliment to Mrs. McCarthy, wife of the Hon. C. J.

McCarthy, who was Colonial Secretary in Ceylon).—A native of the island of Ceylon. Stems two feet long ; flowers in groups of four or five, each measuring three inches in diameter; sepals and petals pointed ; bright rose labellum, dark purple at the base, white towards the edge, and streaked with purple veins. Requires heat and moisture, and lasts a long time in bloom.

Dendrobium macranthum (broad flowered).

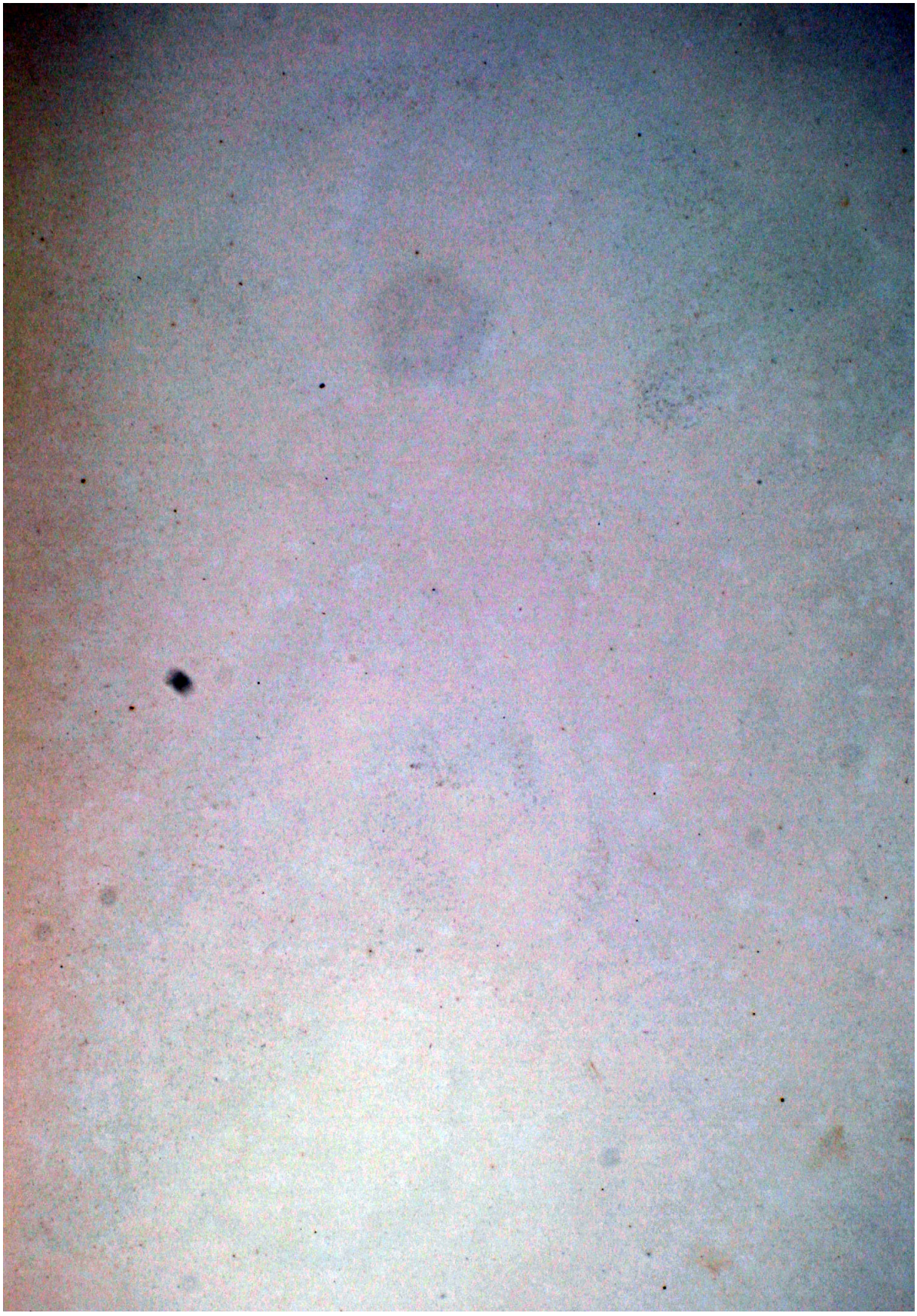
„ *macrophyllum* (broad leaved).

„ *superbum* (grand, noble, stately).

These three names appertain to one and the same species, a magnificent plant, native of the Philippine Islands. The plant is commonly known in India as *D. macrophyllum*, and as such is figured in Mr. Warner's splendid work ; but it is understood that that name more properly belongs to another species, which is likewise known under an incorrect name, *D. Veitchianum*. Its proper name is *Dend. macranthum*, and it is one of the finest and largest Dendrobes in cultivation ; its flowers being often six inches in diameter, sepals and petals rosy pink, lip the same colour, based with a dark claret-coloured stain. The odour of the flower is not pleasant, being exactly like that of the Rhubarb of Medicine. It blooms in March and April, and grows freely in Bengal.

Dendrobium Pierardii (after M. Pierard, the Eastern traveller, by whom it was discovered). —One of the commonest of Indian Orchids, found in the plains of Bengal growing upon trees. Stems of great length, often six to seven feet ; sepals and petals pale pink ; labellum faint primrose-colour, streaked with purple. A lovely plant when profusely covered with its delicate flowers. Blooms in March and April.

Dendrobium primulinum (primrose-like). A rare and charming plant, native of Northern India. Flowers pale pink.



F.W.Burbidge, del et lith.

V.Brooks Day & Son, Imp.

ANGRÆCUM SESQUIPEDALE. Parys 7.50 – 25.–

Plate III.

ANGRÆCUM SESQUIPEDALE.

This magnificent plant is at present an entire stranger in India, the author not having met with a single specimen in cultivation in that country. It is a native of Madagascar, where it was found by the Rev. W. Ellis growing in immense masses upon the trunks and branches of large trees. Its leaves are dark green, about ten inches long, and its flowers, which are very fragrant, are produced in the winter on spikes, which appear in the same manner as those of Aerides, from the axils of the leaves. A fine specimen, now blooming (January, 1874) with Messrs. James Veitch and Sons, has twelve splendid flowers, the sepals and petals of which are like ivory, and six inches in diameter. The most singular feature in this plant is the long spur or tail, eighteen inches in length, which depends from the base of the labellum. Contrary to the habit of most Orchids, this Angræcum first unfolds the flower at the termination of the spike, the last to open being that which is nearest to the stem, at the base of the spike. It requires a tropical heat and abundant atmospheric moisture, and is best grown in a basket filled with charcoal, broken brick, and moss. Most of the members of this genus would suit the climate of Bengal, as *Angræcum superbum* has frequently been exhibited at the Calcutta shows of the Agri-Horticultural Society of India.

From the dried leaves of *Angræcum fragrans*, a native of Mauritius and Bourbon, it is said that a very delicious kind of beverage is made, in the same manner as tea, highly fragrant and delicate in flavour.

The genus is confined to the Islands of Madagascar, Mauritius, and Bourbon, the West Coast of Africa, and Cape Colony. It embraces a large number of species, but few of which are worth cultivating, as their flowers are mostly insignificant. One species alone, *Angræcum funale*, represents this genus in America, being a native of Jamaica; and *Angræcum falcatum*, from Japan, is the only species known to belong to Asia. The flowers are nearly all white, or pale green, and many of them are deliciously fragrant.

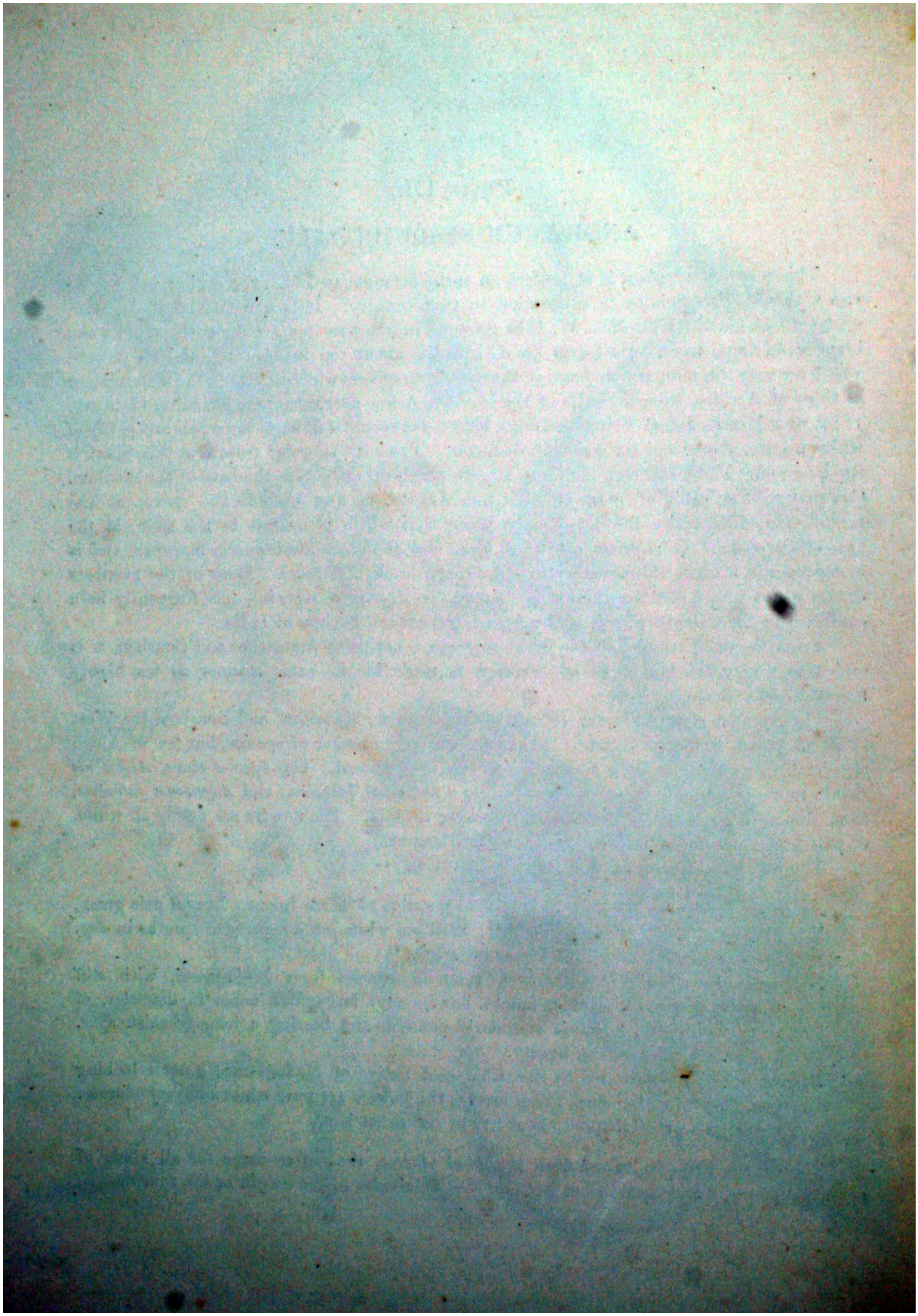
The following species are well worth cultivating :—

Angræcum caudatum (having a long tail).—A native of Sierra Leone. Leaves pale green, graceful in habit; flowers greenish; labellum white; the nectary or spur as in *Ang. sesquipedale*, but only nine inches in length.

Angræcum eburneum (ivory-like).—A splendid species from Madagascar, with stiff leathery leaves, compact in habit; flowers very large, four inches in diameter, of ivory whiteness; labellum singularly pointed, and bearing a long greenish spur, lasting several weeks in beauty.

Angræcum Ellisii (discovered by Mr. Ellis).—A native of Madagascar; a noble looking plant, with shining, dark green leaves; the flowers are pure white and very odorous, borne on a graceful spike; spur five or six inches long.

The generic name is derived from the word *Angrec*, the native name for all kinds of epiphytal plants, " sesquipedale" (a foot and a half), alludes to the length of the spur.



F.W.Burbidge del. et lith.

V.Brooke Day & Son lap.

CYPRIPEDIUM SEDENI. P.Wolter f 2.-

Plate IV.

CYPRIPEDIUM SEDENI.

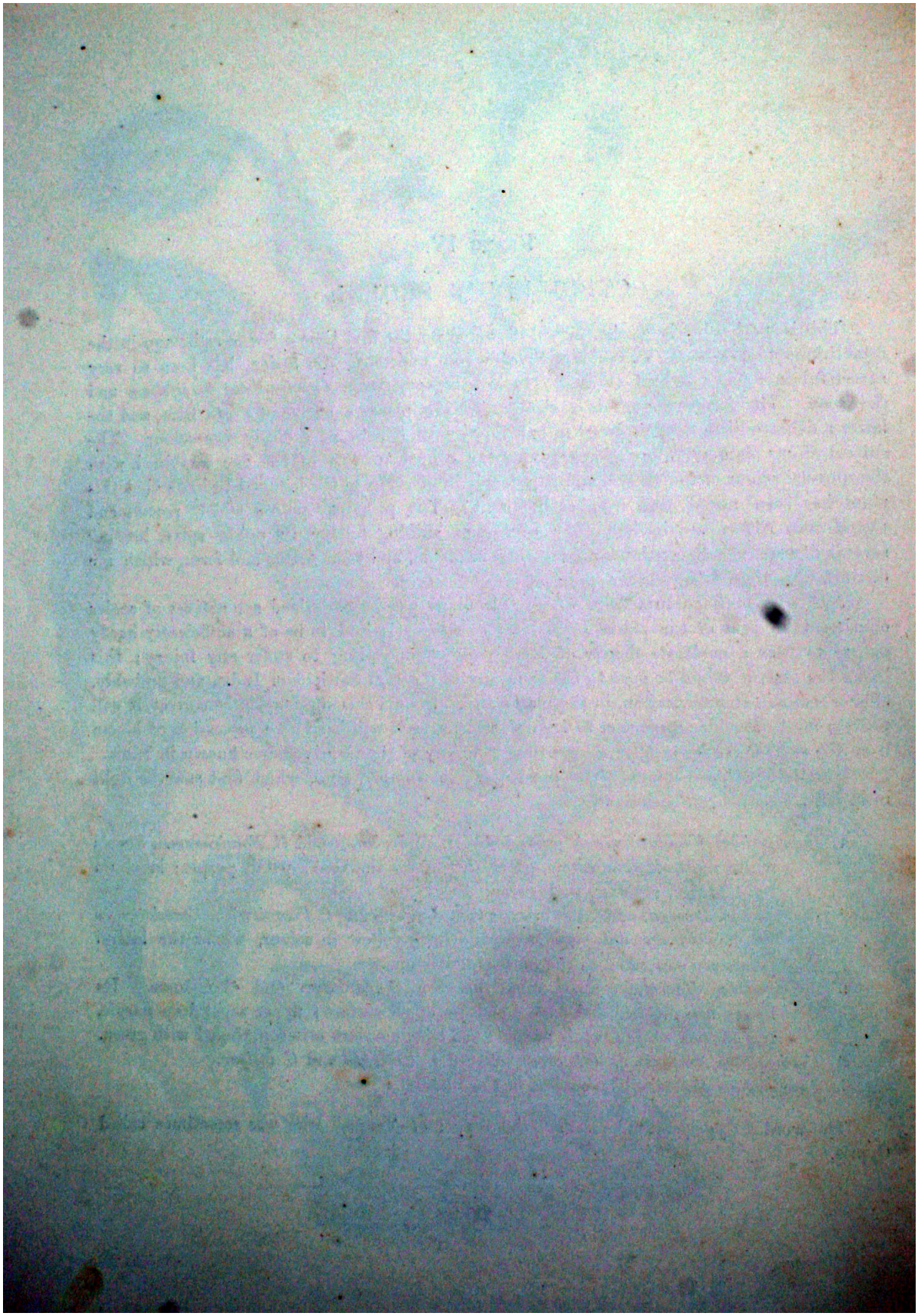
This is another lovely garden hybrid, flowered for the first time a few months ago in the establishment of Messrs. Veitch and Sons, whose assistant, Mr. Seden, has been so very successful in raising hybrid Orchids. It is a cross between *Cypripediums longifolium* and *Schlimmii*. The former parent is a strong growing plant, a native of Costa Rica, and the latter a delicate little Orchid, dwarf in habit, but with flowers of a lovely rose colour. The subject of our plate is intermediate, having the robust growth of the one combined with the unusual colour of the other; and it is deeply interesting to the botanist to know that this plant has been raised true from each parent. The principal points which recommend *Cypripedium Sedeni*, are its handsome evergreen, shining foliage, its noble spike, bearing several flowers which continue a long time in bloom, and their colour and form, which are distinct from those of any other species.

Although both parents from which this plant has been derived are natives of cooler climates than that of the plains of India, this species is said to be of a sufficiently hardy nature to bear a moderate degree of heat without appearing to suffer any injury; this being the case, it would be sure to thrive in any of the Hill Stations of India, and probably, after a season's acclimatization, in the plains also. Should this supposition be correct, it will prove a most valuable acquisition to Indian gardens, as it will keep up a succession of bloom from the same spike for a much longer time than any of the Cypripediums known in India.

The hybrid Cypripediums are at present five in number, all of which first saw the light in Messrs. Veitch's establishment.

1. *Cypripedium Vexillarium*.—A cross between *C. barbatum* and *C. Farrieanum*. Sepals white, mottled with purple, greenish towards the base; petals purple; labellum light brown, streaked with green.
2. *Cypripedium Dominii*, which has been produced by crossing *C. Pearcii* with *C. caudatum*.—Its flowers are not very large, brownish-yellow in colour, whilst the lateral petals are elongated in the most singular manner.
3. *Cypripedium Harrisianum*.—A cross between *C. barbatum* and *C. villosum*. Its leaves are mottled and have a shining upper surface; upper sepal deep purple, tipped with white; petals purple; and labellum dark crimson, tinged with green.
4. *Cypripedium Ashburtoniæ*.—A cross between *C. barbatum* and *C. insigne*.
5. *Cypripedium Sedeni*.—The subject of the Plate.

The word "Cypripedium" means "the slipper of Venus," who was sometimes called Cypris.



F.W. Burbidge del. et lith.

Vincent Brooks Day & Son Imp.

SOPHRONITIS GRANDIFLORA. Antwerpen 2.50

L. Reeve & Co. 5 Henrietta St. Covent Garden.

Plate V.

SOPHRONITIS GRANDIFLORA.

A lovely genus of South American Epiphytal Orchids, comprising but few species, of which the plant figured is a very fine variety of the handsomest. They are all dwarf in habit, and resemble Cattleyas as regards the structure of their flowers. Considering the small size of the pseudobulbs and their single leaf, seldom exceeding three inches in length, their flowers are marvellously large—very often as much as three inches in diameter—a more charming object than this tiny compact plant in free bloom, with eight or ten splendid brilliant scarlet flowers, it would be difficult to imagine. It has the advantage of being a winter blooming plant, and lasts six weeks in perfection. Another good quality is its neat habit, occupying but very little space. It is a native of Brazil, being found growing on moss-covered branches of trees not far from Rio. It is a plant that would succeed well in some parts of India, particularly a little above the level of the plains. It should always be grown on a small block of wood, well protected with moss; the block may with advantage be sunk in a small wooden basket. At no period should the root be allowed to become entirely dry, the treatment recommended for Cattleyas will be found that most suitable for the cultivation of this favourite genus.

The generic name is derived from the Greek, and means "modest and retiring," in allusion doubtless to its small unpretending appearance when out of flower.

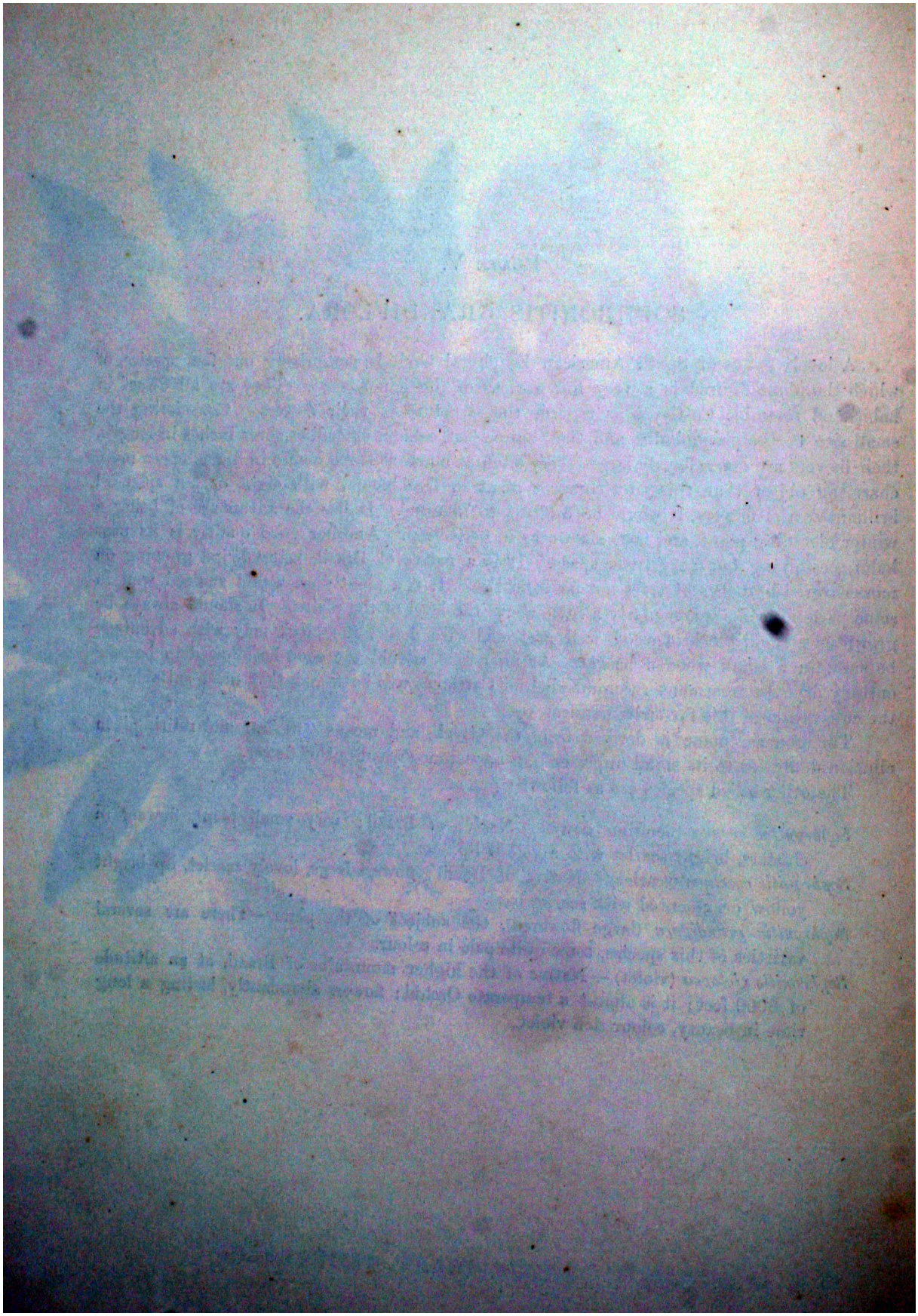
The other allied species are as follows :—

Sophronitis cernua (bending down).—Native of Brazil; very small plant, flowers in clusters, bright scarlet with a yellow lip.

Sophronitis coccinea (scarlet).—Native of Brazil; flowers large, lovely scarlet, lip bright yellow ornamented with scarlet bars.

Sophronitis grandiflora (large flowered), the subject of the plate.—There are several varieties of this species, some quite pale in colour.

Sophronitis violacea (violet).—Native of the higher mountains of Brazil, at an altitude of 8000 feet; it is almost a temperate Orchid; flowers abundantly, lasting a long time in beauty, colour rich violet.



F.W. Burbidge del et lith.

Vincent Brooks Day & Son, Imp.

1. LÆLIA ANCEPS Antwerpiana 15.- 2. LÆLIA ANCEPS var. Dawsoni Antwerpiana 15.-

L. Reeve & Co. 5, Henrietta St. Covent Garden.

Plate VI.

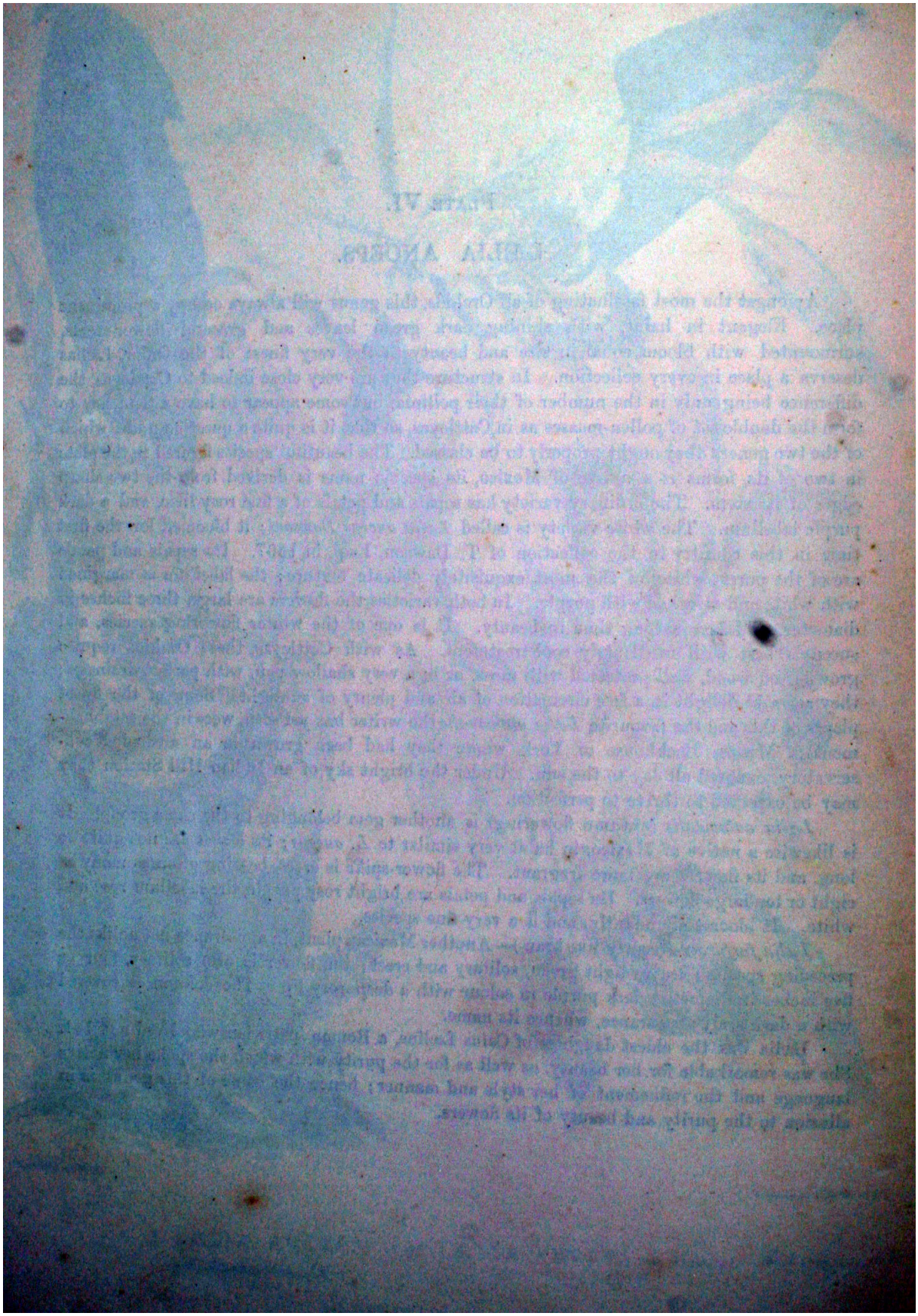
LÆLIA ANCEPS.

Amongst the most fascinating of all Orchids, this genus will always occupy a prominent place. Elegant in habit, with shining dark green leaves and graceful flower-stems, surmounted with bloom equal in size and beauty to the very finest of the Order, Lælias deserve a place in every collection. In structure they are very close indeed to Cattleyas, the difference being only in the number of their pollinia, but some appear to have a tendency to form the double set of pollen masses as in Cattleyas, so that it is quite a question under which of the two genera they ought properly to be classed. The beautiful species figured in the plate in two of its forms is a native of Mexico, its specific name is derived from the two sharp edges of its stem. The ordinary variety has sepals and petals of a fine rosy lilac, and a dark purple labellum. The white variety is called *Lælia anceps Dawsoni;* it bloomed for the first time in this country in the collection of T. Dawson, Esq., in 1867. Its sepals and petals are of the purest white, of the most exquisitely delicate texture; the labellum is margined with white and streaked with purple. In both varieties the flowers are large, three inches in diameter, and last a long time in beauty. It is one of the winter flowering species, and succeeds best with moderately cool treatment. As with Cattleyas, these Orchids require growing on wood, well protected with moss, or in a very shallow pan, with perfect drainage; they seem to delight in a free circulation of air and plenty of sunlight. Some of the finest plants of this and the favourite *Lælia autumnalis* the writer has yet seen, were in the establishment of Messrs. Backhouse of York, where they had been grown in an unshaded conservatory, exposed all day to the sun. Under the bright sky of an Indian Hill Station they may be expected to thrive to perfection.

Lælia autumnalis (autumn flowering) is another gem belonging to the same group. It is likewise a native of Mexico, in habit very similar to *L. anceps;* its leaves are not quite so long, and its flowers are more fragrant. The flower-spike is erect, bearing often as many as eight or ten large flowers. Its sepals and petals are bright rosy purple, the labellum rose and white. It blooms abundantly, and is a very fine species.

Lælia furfuracea (scurfy-like bran.)—Another Mexican plant, in appearance not unlike the preceding species; leaves light green, solitary and erect; the flower is also solitary, four or five inches in diameter, dark purple in colour with a deep rosy lip. The column is covered with a dark scaly appearance, whence its name.

Lælia was the eldest daughter of Caius Lælius, a Roman patrician who lived B.C. 141. She was remarkable for her beauty, as well as for the purity with which she spoke her native language and the refinement of her style and manner; hence the name of this genus is in allusion to the purity and beauty of its flowers.



F.W. Burbidge del et lith.

Vincent Brooks Day & Son, Imp.

CŒLOGYNE CRISTATA.

L. Reeve & Co. 5. Henrietta. St. Covent Garden.

Plate VII.

CŒLOGYNE CRISTATA.

The genus to which this elegant little plant belongs is entirely East Indian, including a very large number of species, of which only a few are sufficiently attractive to be interesting to others than botanists. *Cœlogyne cristata* (crested-tufted) is the finest of them all, bearing numerous panicles of charming flowers of the purest white, slightly crumpled, eight or ten on each spike, of a graceful drooping habit. The labellum is ornamented with a golden fringe. The pseudobulbs are compact, slightly wrinkled, leaves long and narrow; the flower-spike proceeds from the base of the bulbs. A mass of this plant in profuse bloom is a wonderfully attractive object; it flowers early in the year, and is by no means difficult to cultivate. It is a native of Sikkim and the Khassia Hills, where it is found abundantly growing on moss-covered rocks and branches of trees, at an altitude of 5000 to 6000 feet.

It is best grown in shallow pans, or baskets filled with broken brick and charcoal, and packed round with moss. Drainage must be perfect, as it is very subject to rot. When making its growth, it should have plenty of water, but it needs a good season of rest.

There is a variety of this plant called "citrina," which differs in having its lip stained with a delicate lemon colour. Another rare variety has no colour on the lip; the whole flower being pure white.

Among the best of the Cœlogynes are the following:—

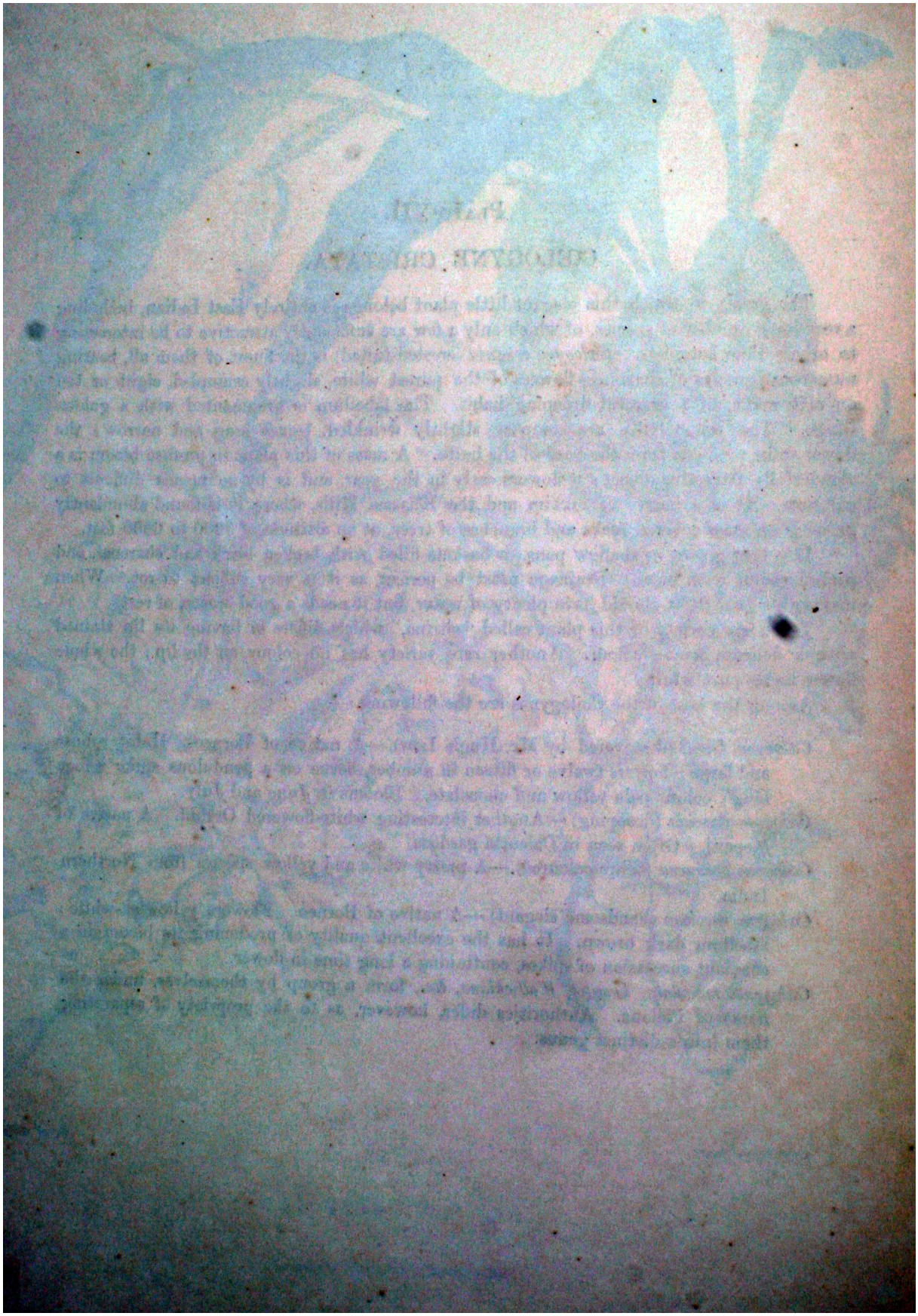
Cœlogyne Lowii (discovered by Mr. Hugh Low).—A native of Borneo. Habit robust and large; flowers twelve or fifteen in number, borne on a pendulous spike a foot long; colour pale yellow and chocolate. Blooms in June and July.

Cœlogyne flaccida (drooping).—Another interesting white-flowered Orchid. A native of Nepaul. Often seen in Calcutta gardens.

Cœlogyne ochracea (ochre-coloured).—A pretty white and yellow species from Northern India.

Cœlogyne speciosa (handsome elegant).—A native of Borneo. Flowers yellowish-white; labellum dark brown. It has the excellent quality of producing its bloom in a constant succession of spikes, continuing a long time in flower.

Cœlogynes maculata, humilis, Wallichiana, &c., form a group by themselves, under the name of Pleione. Authorities differ, however, as to the propriety of separating them into a distinct genus.



W.Burbidge del et lith.

Vincent Brooks Day & Son Imp.

SACCOLABIUM GIGANTEUM. Ypre f3.

L. Reeve & Co. 5 Henrietta St. Covent Garden.

Plate VIII.

SACCOLABIUM GIGANTEUM.

Some of the most charming of all Orchids belong to this genus, which includes a large number of species, all natives of the Eastern Hemisphere. The leaves are firm, fleshy, and evergreen, often with a bright polished surface, sometimes gracefully curved, and usually growing in pairs opposite each other as in *Angræcum*. From the axils of the leaves are produced their elegant spikes of bloom—usually densely covered with small flowers, like a lovely wreath of pendulous habit, often two feet in length, sometimes, however, erect, and with less densely packed flowers. The subject of the illustration is one of the noblest members of this group; it is a native of Burmah, now becoming common in Indian gardens, producing its glorious spikes of sweet-scented flowers in the months of January and February. The sepals and petals are white, spotted with rich lilac or purple; the labellum is purple. It requires plenty of heat, and is easily managed, though it does not bloom until the plant is of moderate size and well established. The flowers last a long time.

The generic name indicates the shape of the lip, which is like a bag or "*sac.*"

The following are some of the best known species:—

Saccolabium Blumei (after Dr. Blume).—A native of the Indian Archipelago. Leaves light green, with fine lines of a darker colour extending the whole length of the leaf. A profuse bloomer. Flowers white, with a delicate violet stain on each sepal and petal. Labellum dark rose colour. Flowers in June.

Saccolabium guttatum (spotted or splashed with colour).—Common in the plains of Assam and Burmah. Dense sprays of white flowers spotted with purple. Labellum purple.

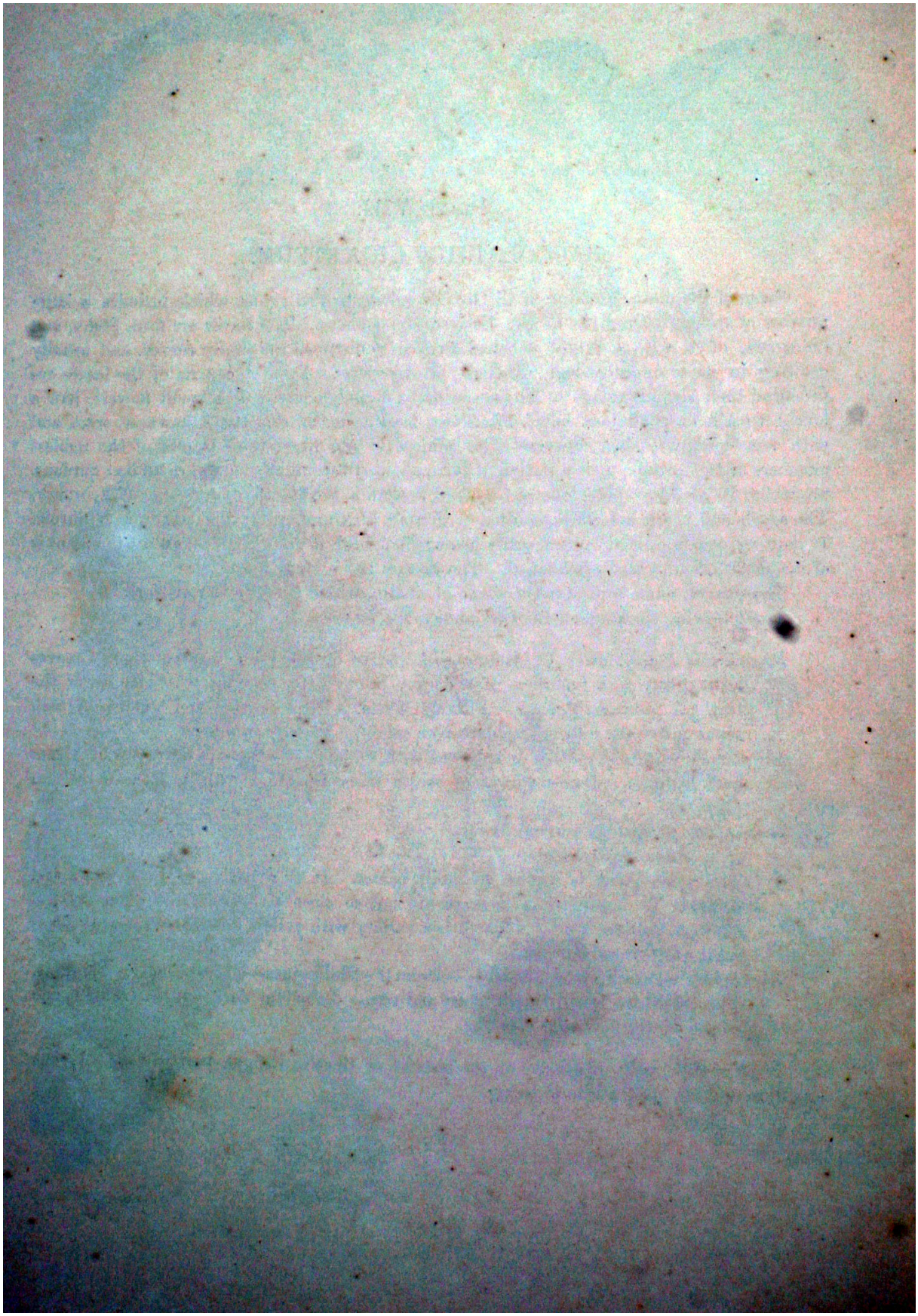
Saccolabium curvifolium (curved leaves).

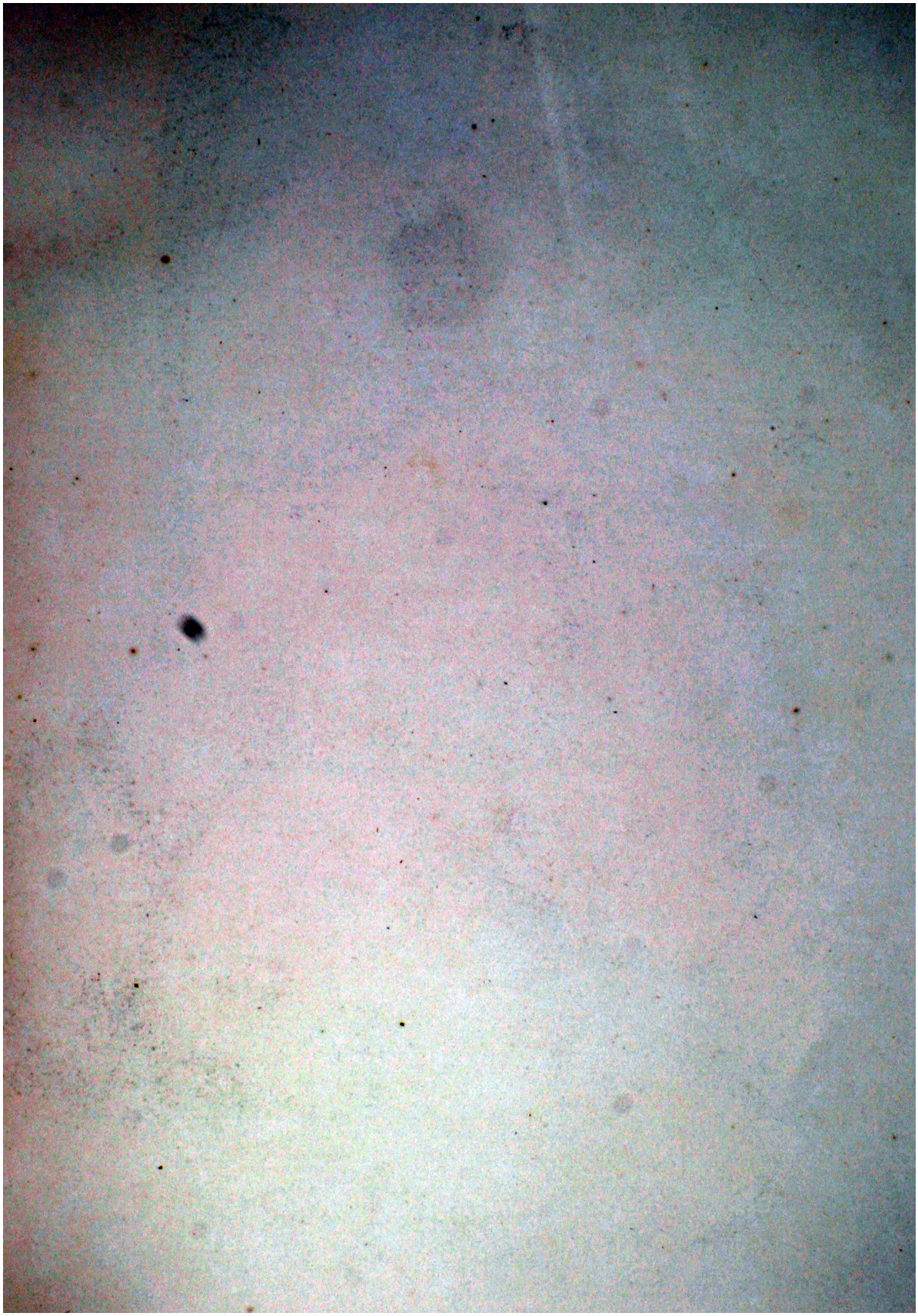
,, *miniatum* (scarlet).

The same plant is known by both names. It is a native of Java, small and compact in habit. The racemes are not so close as most of the other species. Flowers brilliant scarlet. There is a variety with yellow flowers—at present somewhat rare—from Burmah.

Saccolabium violacum (violet coloured).—From the Philippines—a great beauty. Fragrant. Flowers white, spotted with violet and rose. Labellum dark purple. This is one of the winter flowering varieties.

Most of this genus will thrive on the boughs of trees in Bengal, partially shaded; but attention must be paid to the watering.





F.W.Burbidge del. et lith.

V.Brooks Day & Son Imp.

1. LYCASTE SKINNERI

2. " " " var. alba. f. 25 - 75

L. Reeve & Co. 5. Henrietta. St. Covent Garden.

Plate IX.

LYCASTE SKINNERI.

Very few species can boast of so endless a variety of colour and pencilling as the subject of our plate, from the pure white we have figured to the deepest purplish rose; and blooming as they do in great profusion in the winter months, they are, perhaps, amongst the most striking features of English Orchid Houses at this time of year. Although natives of Guatemala, and classed amongst the essentially cool Orchids, they will thrive moderately well in heat; there are plants in the Calcutta Botanical Gardens which have flowered, as have also several species of the closely allied Maxillaria; but in the Hill Stations of India, *Lycaste Skinneri* ought to thrive as well as any other temperate species. It is most easy to cultivate, and is always a good-looking plant, with its dark green-plaited leaves gracefully bending over the pot or basket in which it is grown. The flowers are borne singly upon a spike, produced from the base of the pseudobulb; they vary in size from four to seven inches in diameter. The sepals and petals are usually white tinged more or less with rose, and the labellum is deeply spotted and streaked with rich crimson. The pure white variety is very rare.

Lycastes should be grown in fibrous free soil thoroughly drained, they require plenty of water when growing, and the roots must never be allowed to become quite dry, even during their season of rest. They commence making fresh growth after blooming; they should, therefore, be propagated by division as soon as possible after the flowers have faded. Amongst the good points of this species must not be forgotten, the length of time, often as long as two months, that they remain in bloom, and the abundance and consequent cheapness of the plants.

There are some other species belonging to this genus which well deserve a passing mention:—

Lycaste Harrisoniæ.—A native of Brazil. Flowers three inches in diameter; petals and sepals creamy white and waxy; labellum purplish lilac. It will bear a greater degree of heat than *Ly. Skinneri.*

Lycaste citrina from Brazil. Flowers pale lemon colour; labellum white, marked with lilac.

Lycaste gigantea.—A very large-growing species, with leaves two feet long. Flowers greenish-yellow; labellum dark purple bordered with orange.

F.W.Burbidge, del et lith.

V.Brooke Day & Son, imp.

VANDA CATHCARTII.

L. Reeve & Co. 5, Henrietta. St. Covent Garden.

Plate X.

VANDA CATHCARTII.

The genus Vanda contains many of the noblest plants in cultivation. Whether it be for the bright shining evergreen leaves and the elegance of their habit, or the rich colours and gorgeous spikes of their bloom, there is scarcely a member of this aristocratic family that is not a general favourite with lovers of the beautiful. They all belong to India, Burmah, the Eastern Isles, and China, and all require a humid atmosphere and considerable heat, and plenty of water when growing, and when at rest, should have sufficient moisture to keep their leaves from shrivelling. They are all epiphytes, and are best grown on blocks of wood covered with moss, or in baskets or pots filled with lumps of broken brick and charcoal. The subject of our plate is at present rare, and has afforded us a curious exemplification of the fact that plants are not always found in nature under the conditions best adapted for them. Mr. Scott, in a paper published in the Journal of the Agri-Horticultural Society of India, gives an interesting account of the results which have followed the opening out of the forests on the slopes of the Sikkim Himalayas for the establishment of Cinchona cultivation in the neighbourhood where this Orchid was formerly discovered, and for years considered very rare and delicate. It grew in the dense shade of a tropical forest, in a close and humid atmosphere. Of young plants there were scarcely any. The plant had become so weakly in constitution, that it was with difficulty brought down to Calcutta alive, and when there, could by no means be said to thrive under cultivation. Now that the trees have been cleared off the hill sides, there is a freer circulation of air, the sun penetrates to the ground, and more moisture is drawn off. *Vanda Cathcartii* has quite altered its character; it has become more robust, more woody, and bears a journey as well as any other Vanda. Young plants, too, are springing up in all directions, and the species bids fair to become better known and appreciated.

In habit this Vanda has more of the way of Renanthera. Its growth is long and straggling, and the leaves alternate; the spike hangs down, bearing four to six large flowers; sepals and petals reddish-brown, striped with close transverse bars of yellow. The labellum is curiously shaped, golden yellow in colour. The plant from which the figure was drawn flowered with Messrs. James Veitch and Sons, at Chelsea, in January last.

The word Vanda is the ancient Sanscrit name for the mistletoe, and became subsequently applied to all kinds of epiphytal plants.

F.W. Burbidge del et lith.

V. Brooke Dijk & Cos. Imp.

1. ONCIDIUM PAPILIO PICTUM. Hamburg 12-3.-

2. ..... " ..... " ..... var. Krameri.

L. Reeve & Co. 5. Henrietta St. Covent Garden.

Plate XI.

ONCIDIUM PAPILIO, var. Krameri and var. pictum.

Amongst the American species which have now become quite acclimatized in India, none are such general favourites as the curious *Oncidium papilio*, with its fine variety "majus." Our Plate represents two other varieties of the same species exhibiting a very marked difference in colouring.

Its name indicates its remarkable similarity in form to a butterfly; the single flower raised on the end of a long slender stalk which waves about with each breath of wind affords life and motion to aid the delusion. The writer has known a short-sighted gentleman really mistake this flower for a butterfly fluttering over the adjacent plants.

It is a native of Trinidad, possessing flattish dark coloured pseudobulbs, each bearing a single leathery leaf, beautifully mottled with purplish brown. The flowers are yellow, in "majus" and "pictum" barred, and in "Krameri," spotted with rich brown. In "Krameri" the labellum is more crisped or wavy at the edges than in the other varieties. The flower-stalk should never be cut off, as it will continue to put forth bloom for several years, affording a constant succession quite irrespective of season.

It is best grown attached to a block of wood, and needs scarcely any special care. In the dry season a little moss tied around the roots will be found necessary to prevent them from becoming too dry. It will also do well in a pot filled with broken brick.

The genus Oncidium comprises a very large number of species, all of them natives of America, but differing very much in habit. In some species the leaves are terete, or quill-like, in others no pseudobulb is apparent, in others again there are large shining pseudobulbs, in some elongated, in others globular, and in others again quite flattened. The prevailing colours are brown and yellow, though some are rosy, and some are speckled with carmine or scarlet. The peculiarity which unites them all under one genus is the singular protuberances they all possess at the base of the labellum.

The following species are all worthy of a place in every Indian collection; the climate of the plains seems to suit some of them admirably:—

Oncidium ampliatum (enlarged, extended).—A native of Panama, well known in Calcutta. Pseudobulbs lightish green and flattened; flower scapes two to three feet high, branched and bearing a profusion of bright yellow flowers lasting a long time. Blooms in April and May.

Oncidium Cavendishii (the family name of the Duke of Devonshire).—From Guatemala. Leaves broad, leathery, and bright green; flowers borne on a branching panicle a foot long, bright yellow with darker spots.

Oncidium cebolleta (from the French Ciboullete, a small kind of Onion, the leaves of both being somewhat similar).—A native of Jamaica. Flowers borne on a branching spike small in size, but beautifully spotted with dark brown or crimson; leaves dark green, quill-like.

Oncidium crispum (wrinkled or crisped on the edges).—A native of Brazil. Dwarf in habit; pseudobulbs brownish, round and flattened; leaves in pairs, short and

thick; flower-spike long; flowers from two to three inches in diameter; sepals and petals a rich bronzy colour; labellum broad and expanding, speckled with bright red and yellow. This is a very fine species. There is a variety of this plant with flowers deeply margined with rich yellow.

Oncidium Lanceanum (after Mr. J. H. Lance, a well known collector of Orchids in Surinam).—A noble plant from Guiana. Leaves twelve to eighteen inches long, bright green, but speckled all over with purple brown spots; no pseudobulbs; flower-spike upright, eighteen inches to two feet high; flowers large; sepals and petals rich yellow blotched with crimson; labellum usually a deep superb violet hue, though sometimes much paler, very fragrant.

Oncidium luridum guttatum (yellowish-brown, spotted).—A species well known for years in India. A native of Jamaica. Plant very similar in habit to the preceding; leaves not spotted; flower-spike much longer and freely branched; flowers small, but profuse; bright yellow, heavily blotched with brown and red. This species was known to Linnæus, who described it as *Epidendrum guttatum*.

All the above require similar treatment.

F.W.Burbidge del. et lith.

V.Brooke Day & Son, Imp.

CYPRIPEDIUM STONEI. 3 spots £3.60

L. Reeve & Co. 5, Henrietta. St. Covent Garden.

Plate XII.

CYPRIPEDIUM STONEI.

For singularity of shape, probably no genus of Orchids can vie with the extraordinary "Lady's Slipper" in all its widely differing species. They are natives alike of the Western as well as of the Eastern Hemispheres, and one species is a native of England. They are some of them found in frozen Canada, others on the hill-sides at an altitude of 6000 to 8000 feet above the sea, and others, again, in the tropical islands of the Indian Archipelago. Some are dwarf growing, throwing up but a single flower on each spike, others produce fine racemes of six or eight flowers. *Cypripedium Stonei*—named in compliment to Mr. Stone, gardener to John Day, Esq., of Tottenham—is a native of Borneo. It is a terrestrial orchid, and requires pot-cultivation in light free soil, in which is a plentiful admixture of lumps of charcoal. It should have plenty of water when growing, and the roots must never be allowed to become quite dry; the drainage must be perfect, as water stagnant about the roots is certain to cause rot.

Its leaves are about a foot long, and the flower-spike bears generally three lovely flowers; the sepals, two in number, are white, streaked with deep purple; the lateral petals are narrow, elongated, and curiously twisted, yellow in colour, blotched with purple; the slipper-shaped labellum is white, tinged with rosy purple, and veined all over with bright crimson.

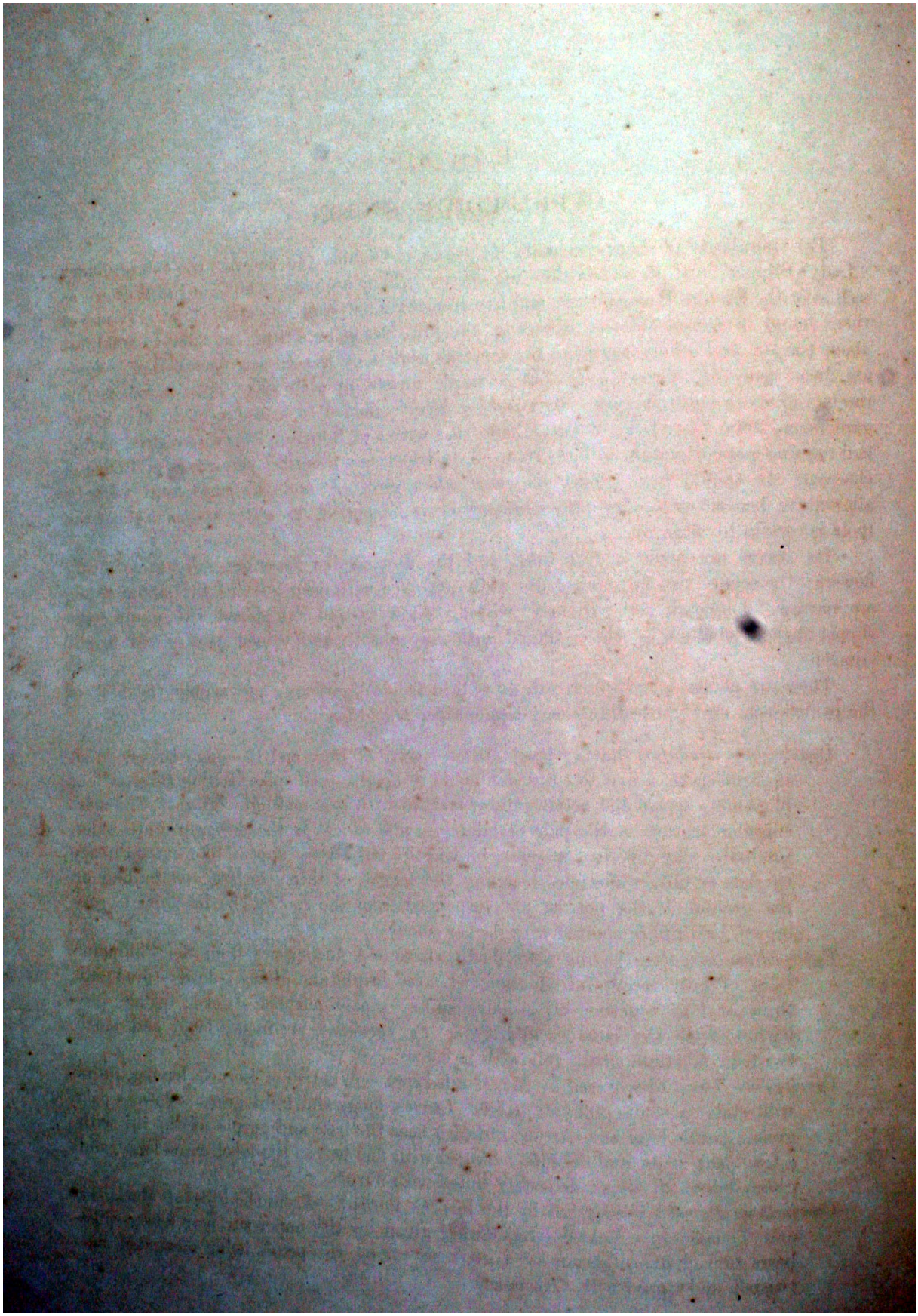
These are plants, all of which will do well in tropical gardens; and among the best of the panicle-bearing Cypripediums may be described the following:—

Cypripedium caudatum (having long tails).—Native of Peru and Panama; flowers on an upright spike, a foot to eighteen inches in height, each spike bearing three or four blossoms; sepals and petals yellow, marked with rose and light brown. The most singular feature is the pair of lateral petals, which, as the flower becomes older, gradually day by day increase in length, until they appear like extraordinary ringlets or tails, sometimes reaching the length of thirty inches, and trailing on the ground, if the pot be not suspended from the roof. The labellum is rosy brown, beautifully spotted with darker colour.

Cypripedium lævigatum (having a polished surface).—A fine species from the Philippine Isles, of only recent introduction. Leaves bright and glossy; flowers produced, three or four together on a hairy spike; sepals purplish-striped; petals very narrow, with the same peculiarity as *Cy. caudatum*, six inches long, and much twisted; labellum small, yellowish in colour.

Cypripedium Lowii (discovered by Mr. Hugh Low).—A native of Borneo, having, in its wild state, a semi-epiphytal habit. Leaves long, and light green; flowers pale green; petals long and narrow, greenish near the base and purple at the tip, with a few black spots, and delicately fringed with fine hairs; the labellum is large, and glossy-brown in colour, delicately tinted with purple.

Cypripedium Parishii (discovered by the Rev. C. Parish).—From the hills of Martaban and Tenasserim. Leaves long, darker green on the upper surface; flower-spike bears four or five blossoms of a greenish colour, the petals being elongated and twisted, and tipped with dark purple.



F.W.Burbidge, del. et lith.

Vincent Brooks Day & Son, Imp.

ODONTOGLOSSUM GRANDE.

Plate XIII.

ODONTOGLOSSUM GRANDE.

A large genus of conspicuous beauty, for the most part natives of the cool mountainous regions of Mexico and New Granada, found growing at considerable elevations above the sea. Botanically, the difference between Odontoglossums and Oncidiums is but very slight; the former, as the generic name indicates, are recognisable by the tooth-like forms at the base of the labellum. Many of them are of but recent introduction, and some may be counted amongst the most lovely of all Orchids. In England they are considered essentially cool-growing plants, requiring little if any heat; and consequently they are not so well adapted for cultivation in the plains of Bengal, but for the Hills, particularly the Neilgherries, they would probably be most admirably suited; and if once they become established, they will be certain to be the greatest favourites. Odontoglossums do not like the direct sun, as their foliage is delicate; they are epiphytal and grow best on wood, or in baskets filled with moss and broken brick; free drainage is essential, and so is abundant moisture when in a growing state; even when at rest they will need a little moisture at the roots.

The species which has been selected to illustrate this interesting branch of the family is one of the oldest and best known, as well as one of the most striking in appearance when in flower. It is a native of Guatemala. Its pseudobulbs are large and smooth; its flowers—some twelve or fourteen in number—are produced upon an upright spike rising from the base of the pseudobulbs; they often measure six or seven inches in diameter; in colour they are a beautiful bright yellow, blotched and banded with rich brown, and last a long time in beauty if the plant be kept moderately dry.

Amongst the yellow and brown Odontoglots may be named the following:—

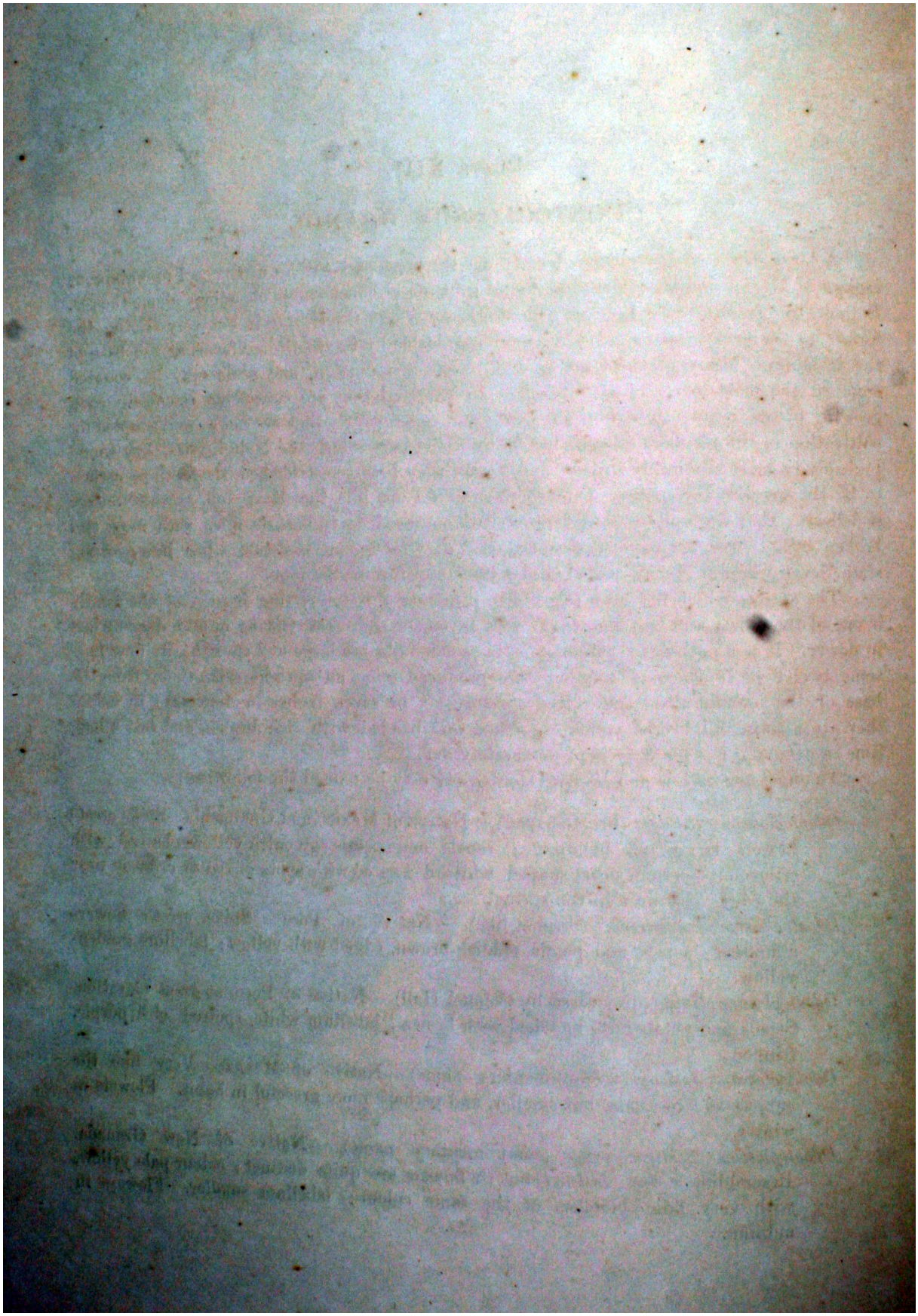
Odontoglossum cordatum (heart-shaped).—Native of Mexico and Guatemala. Spike erect; flowers large and handsome; sepals and petals greenish-yellow, barred with crimson; labellum heart-shaped, white, decorated with spots of red or crimson near the edge. Flowers in the spring.

Odontoglossum coronarium (coronet-like). — Native of Peru. Spike erect; flowers abundant; sepals and petals reddish-brown, edged with yellow; labellum golden-yellow.

Odontoglossum Hallii (discovered by Colonel Hall).—Native of Peru, at great elevation. Sepals and petals buff, blotched with brown; labellum white, spotted with purple, fringed.

Odontoglossum Insleayi (complimentary name).—Native of Mexico. Very like the subject of the plate, but smaller, and perhaps more graceful in habit. Flowers in winter.

Odontoglossum Schlieperianum (complimentary name). — Native of New Granada. Resembling *Odont. Insleayi*, but its flowers are quite distinct; colour pale yellow, with very faint blotches of the same colour; labellum smaller. Flowers in autumn.



F.W. Burbidge. del. et lith.

Vincent Brooks Day & Son. Imp.

BARKERIA LINDLEYANA.

v. Centeriæ.

Plate XIV.

BARKERIA LINDLEYANA var. Centeriæ.

A really elegant little plant—is deserving of a place in every collection. It is a native of Costa Rica—small and neat in habit, occupying but very little room, but when in flower a most charming object. Barkerias are all epiphytes, and lose their leaves when they have completed their growth; they are best grown upon flat pieces of wood, without any protection of moss about their roots, which nevertheless require to be kept moist. When growing they will take almost any amount of sun heat, and love a free circulation of air. They would probably succeed well in India. The variety figured, one of the finest, is but of recent introduction, its flowers are large—rosy pink in colour—the base of the lip is white speckled with crimson, whilst the tip is stained deep purple; the white spot in the centre of the lip is streaked with crimson.

The specific name of this plant commemorates the service to Botany rendered by the late Dr. Lindley, who died in 1865, one of the most enthusiastic students of this interesting Order.

Amongst the other species belonging to this genus may be named:—

Barkeria elegans (very worthy).—Native of Guatemala. Sepals and petals rosy red; labellum crimson, edged and spotted with a paler colour.

Barkeria Skinneri (discovered by Mr. U. Skinner), more properly an Epidendrum.

Barkeria spectabilis (graceful, worthy to be taken notice of).—Native of Guatemala. Flowers rosy-colour, spotted with crimson, but there is an infinite variety in the tints of colour of this pretty Orchid, rendering it a great favourite. It flowers in May and June.

F.W. Burbidge, del. et lith.

Vincent Brooks Day & Son, Imp.

PHALÆNOPSIS SCHILLERIANA 3/June 4.50

Plate XV.

PHALÆNOPSIS SCHILLERIANA.

No class of Orchids seem so much at home in the climate of the plains of India as Phalænopsids, and none certainly give so much general satisfaction as they do when they continue month after month displaying their marvellously beautiful flowers. As plants, they are small and compact, having but very short stems, the leaves are broad, thick, and shining, and in the species figured, most handsomely variegated, with a dark green ground marbled with white or grey, sometimes in spots, and at other times in bands, the under surface of the leaf being a lovely dark purple in colour. The flowers are large, and produced upon spikes or panicles, in great abundance, when the plants are strong and large, but ordinarily a spray of twenty flowers would form a most handsome object.

It is worthy of remark, that although English horticulturists seem to be able to produce a greater number of flowers than are usually seen in Indian gardens, yet as regards both size and colour, the advantage is greatly in favour of the tropical cultivator.

There are but few species of this splendid genus, and all are natives of the East, where they are found growing in hot, damp, humid situations. They are best grown upon blocks of wood, or sunk in baskets filled with crocks and moss. In Bengal, the block will be sufficient, but up-country the plants seemed to require more protection, and baskets are there found to be the best. In the cold weather they need protection, and must be placed under glass, or the flower buds will drop off before opening. This precaution is only necessary where there may be frost at night. The roots are thick and fleshy, and the growing points very tender, and must be most carefully handled. They require plenty of water when growing, and must never be allowed to become quite dry. The leaves will always indicate if the plant requires moisture by becoming shrivelled; this must never be allowed.

The generic name Phalænopsis signifies "moth-like," the broad outspread lateral petals looking so much like the wings of some wonderful butterfly. The species figured is named in compliment to Mr. G. W. Schiller of Hamburg, an enthusiastic amateur cultivator of orchids. It is a native of the Philippine Isles, where it grows on the trunks of trees in moist shady places. It sometimes produces as many as 200 flowers at once, its roots are flat and silvery in appearance, spreading over a considerable surface. The flowers vary in colour and marking in different individuals, sometimes being so pale as to be almost white in general appearance, whilst others are quite dark rose. In all the varieties the petals and sepals are edged with white, the labellum darker in colour and beautifully spotted with crimson. The plant from which the Plate was drawn is a remarkably handsome variety, in the collection of Mr. Bull of Chelsea.

The other large flowering Phalænopsids are as follows:—

Phalænopsis amabilis (lovely).—Native of Manilla, flowers pure white, three inches in diameter, the labellum streaked with deep rose.

Phalænopsis grandiflora (large flowered).—Native of Borneo and Java; in India often

confused with the above, which it resembles very closely; the flowers, however, are larger, and the base of the labellum is stained with golden yellow; the leaves are also different, being broader and paler in colour than *Ph. amabilis*. In a variety of *Ph. grandiflora*, called "aurea," the deep yellow of the labellum is more conspicuous.

Phalænopsis Lüddemanniana (a complimentary name).—Native of Manilla, flowers two inches across, blush colour, barred with yellow and amethyst, lip marked with rich violet.

Phalænopsis Lobbi.

„ *intermedia* var. *Portei.*

A native of the Philippines, supposed to be a natural hybrid between *Ph. amabile* and *Ph. rosea*, a very rare and beautiful plant.

W.F.Burbidge del.et.lith.

Vincent Brooks Day & Son, Imp.

Antwerpen f 3.-

CYMBIDIUM EBURNEUM

Plate XVI.

CYMBIDIUM EBURNEUM.

An extensive genus of East Indian Orchids, only a few species of which are worthy of a place in a small and choice collection. They usually occupy a great deal of room, and though the foliage is graceful and evergreen, their bloom, with but few exceptions, is inconspicuous. They are epiphytal in habit; but, like pot cultivation, with rather richer material than is given to most Orchids. Their inflorescence is either erect or pendulous—in racemes sometimes two feet long, never branching. The flowers may be recognised by their singular curved ridges upon the lip, which resemble the bottom of a boat, hence their generic name. Their leaves are long, narrow, and pointed, in some species the tip of the leaves is divided into two points.

The species figured in the Plate is certainly the best, and is rather scarce and valuable. It is a native of Eastern Bengal. The flowers are remarkable for their pure ivory-like whiteness; they are about five inches in diameter, and have the advantage of being deliciously fragrant. The labellum is ornamented with a rich golden yellow streak.

There are a few other Cymbids which deserve notice:—

Cymbidium Mastersi (after Mr. Masters, of the Calcutta Botanical Gardens).—In appearance very like *Cym. eburneum*. Native of Assam. Flower-spike erect. Flowers large, white, labellum tinted with pink and has a yellow centre, fragrant.

Cymbidium giganteum (the largest).—Native of Nepal, Sikkim and Assam. Flowers semi-pendulous, brown and purple.

Cymbidium Hookerianum (after Dr. J. D. Hooker of Kew).—Native of the Bhootan Hills. Flower-spike erect. Blossoms large, sepals and petals greenish, labellum yellow, blotched with purple.

Cymbidium aloefolium.—The species commonly found growing on Mango trees in Lower Bengal.

It will be observed in the Plate that one of the spikes bears flowers having delicate purple spots on the labellum. This variety is known as *Cym. eburneum* v. *Dayi*.

F.W. Burbidge del. et lith.

V. Brooks Dept. & Son. Imp.

MASDEVALLIA LINDENI.

L. Reeve & Co. 5, Henrietta St. Covent Garden.

Plate XVII.

MASDEVALLIA LINDENI.

To attempt the cultivation of these essentially cool Orchids in the plains of India, or in any tropical climate, would be attended with the utmost difficulty; it is doubtful, indeed, if they would live at all in Calcutta; nevertheless, they seem destined to occupy so important a position from their neat compact habit, their easy management, and their abundant bloom—to say nothing of the brilliant and uncommon colours of the flowers of some species, that they demand notice in every work on Orchids. At such elevations as Simla, Mussoorie, or Darjeeling, it is not improbable that they might be found to succeed admirably. They are of comparatively recent introduction, and are natives of the high mountains of New Grenada and Peru, where they were discovered growing at an altitude of from 6000 to 8000 feet above the sea. In cultivation they require a peaty soil, well mixed with moss; the drainage must be perfect, and abundant moisture supplied, especially when making their growth; even when at rest the roots must not be allowed to become too dry.

The plant from which the Plate was drawn is in Mr. Bull's collection, it had eleven blossoms, and is one of the finest in cultivation.

Amongst the best of the Masdevallias are the following:—

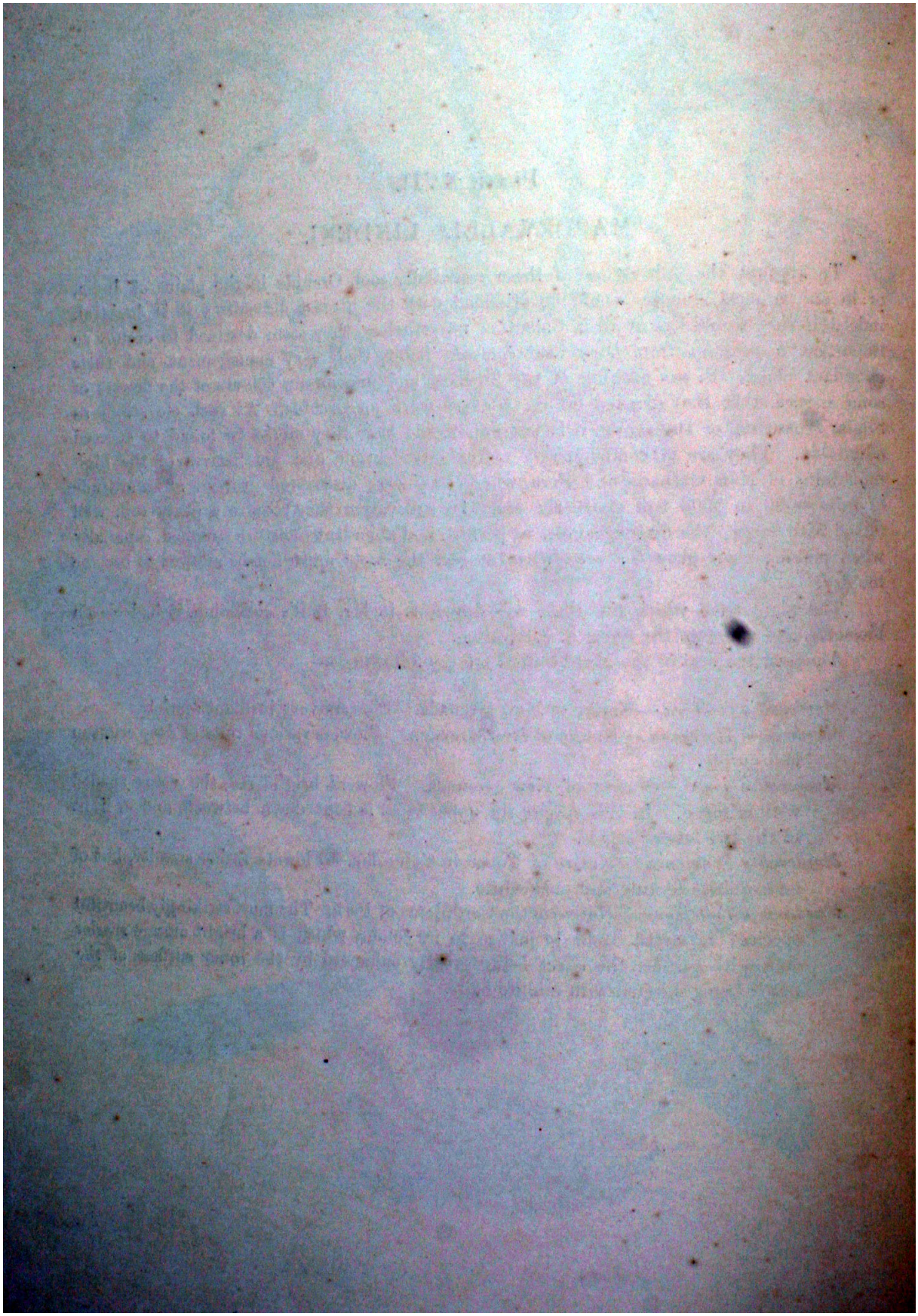
Masdevallia coccinea.—Native of New Grenada. Flowers very brilliant scarlet.

Masdevallia Harryana.—Native of New Grenada. Flowers various tints of deep crimson and purple.

Masdevallia ignea.—Native of New Grenada. Flowers bright red, the veins shaded with crimson. In this species the upper sepal is bent down between, and in front of the two lateral sepals.

Masdevallia Tovarensis.—Native of Tovar in Columbia. Flowers rather smaller, but of an exquisite texture and pure white.

Masdevallia Veitchiana.—Native of the Cordilleras of Peru. The most strikingly beautiful species; no artist could do justice to its colour, which is a bright orange scarlet shot with purple, the effect being greatly enhanced by the inner surface of the flower being covered with minute hairs.



F.W.Burbidge del et lith.

V.Brooks Day & Son Imp.

CATTLEYA GIGAS.

Hamburg 4.—

L.Reeve & Co. 5 Henrietta. St. Covent Garden.

Plate XVIII.

CATTLEYA GIGAS.

Amongst the most strikingly handsome of the more recent introductions, the glorious Cattleya figured in the Plate stands pre-eminent. Its specific name was given to it by M. Linden on account of the size of its bloom, but there is every reason to believe that we have not yet seen its full glory, the plants being but recently imported—but its principal features, the immense size of its flowers, its broadly expanded labellum, and the splendid spots in its throat, together with the white and yellow side stains, render it superior to any other known species, and as such, a most welcome addition to that already magnificent genus. It is a native of New Grenada, whence it was received from Mr. Roezl. The plant from which the Plate was drawn, flowered recently in the collection of Messrs. Veitch and Sons.

Cattleyas flourish best in pots filled with broken brick and lumps of charcoal, the surface protected with a little fresh moss. In order to steady them firmly in the pots, it is sometimes advisable to attach them to a small block of hard wood, partly sunk in the material, taking care that the growing points of the rhizomes are free above the surface, otherwise they will be liable to damp off. When thus grown, water must be applied only in sufficient quantity to keep the soil moderately moist, and even when in free growth, it is not advisable to deluge them oftener than once or twice a week, and in the rainy reason not at all. These remarks do not apply to the dwarf kinds grown on wood, which of course require more moisture, as the evaporation is so much more rapid.

Amongst the larger flowering Cattleyas may be enumerated the following:—

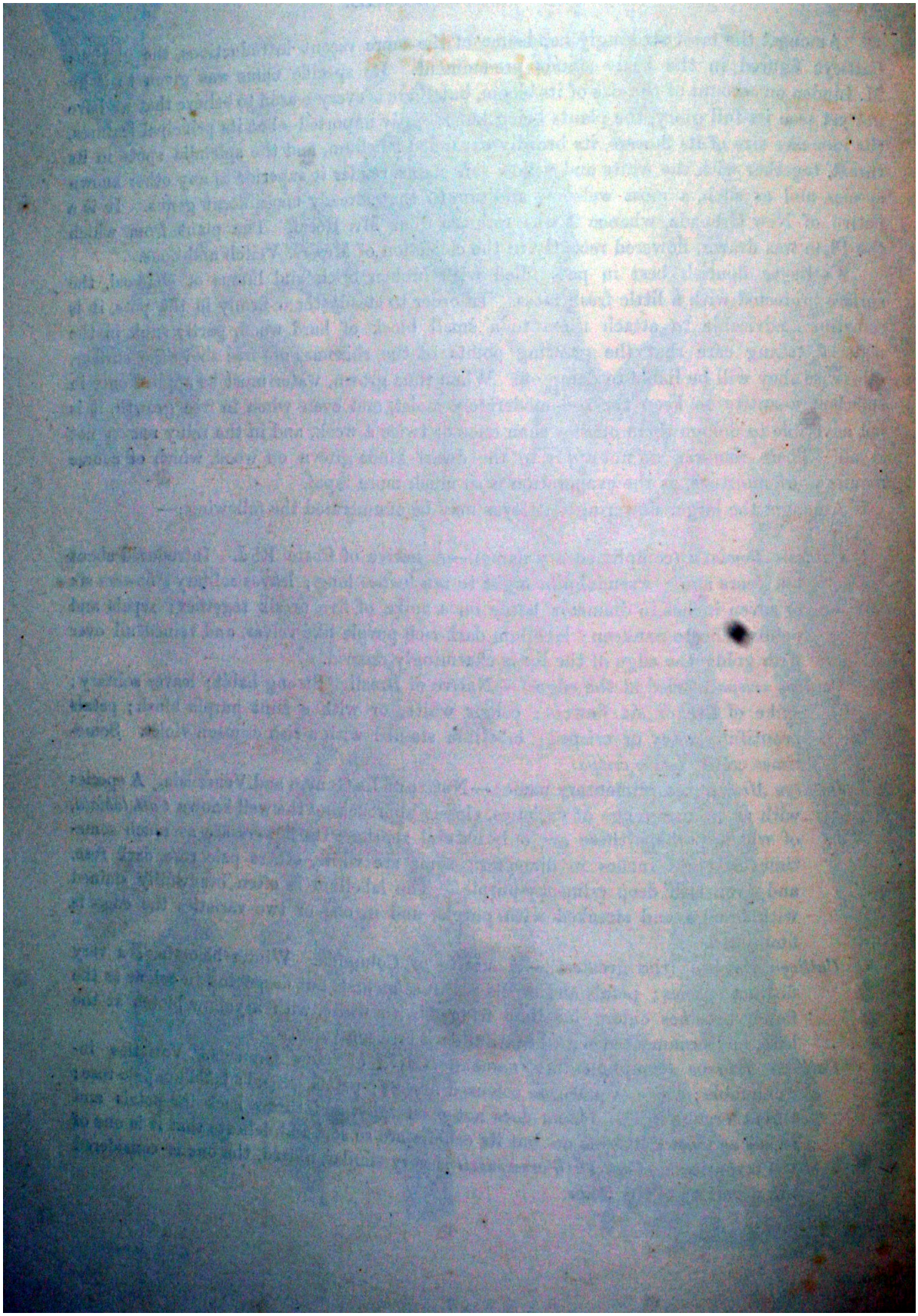
Cattleya Dowiana (complimentary name).—A native of Costa Rica. Introduced about ten years ago. Pseudobulbs eight to ten inches long; leaves solitary; flowers six or seven inches in diameter, borne on a spike of five or six together; sepals and petals delicate nankeen; labellum dark rich purple like velvet, and veined all over with gold; the edge of the lip is charmingly crisped.

Cattleya crispa (curled at the edges).—Native of Brazil. Strong habit; leaves solitary; spike of five or six flowers; colour white, or with a faint purple blush; petals beautifully wavy or crisped; labellum stained with a rich crimson violet. Sometimes called *Lælia crispa*.

Cattleya Mossiæ (complimentary name).—Native of La Guayra and Venezuela. A species with an infinite range of varieties, closely approaching the well known *Catt. labiata*, of which, perhaps these are only natural sports. Its flowers are as much sometimes as eight inches in diameter; some are white, others pale rose, dark rose, and even rich deep crimsony-purple. The labellum is often beautifully stained with orange, and streaked with purple, and in one or two varieties the edge is fimbriated.

Cattleya maxima (the greatest).—A native of Columbia. Winter blooming; a very distinct species; petals and sepals pale-rose at first, but deepening in colour as the flower becomes older; labellum fringed with white, with a yellow blotch at the base, and ornamented with beautiful dark crimson veins.

Cattleya Trianiæ (complimentary name).—Native of New Grenada. Varieties innumerable; white or pale-rose coloured flowers; petals crisped; labellum pale-rose; throat orange. The bloom does not open fully, and throw back its petals and sepals as most Cattleyas do, but its colours are so soft and delicate that it is one of the favourites. *Cattleya Warscewiczii* is very similar, indeed, the one is considered but a variety of the other.



F.W. Burbidge del. et lith.

V. Brooks Day & Son, Imp.

DENDROBIUM BOXALLI. *Spore f3.-*

L. Reeve & Co. 5 Henrietta St. Covent Garden.

Plate XIX.

DENDROBIUM BOXALLI.

The plant figured in the Plate is the last novelty from the inexhaustible mountains of Martaban, where it was discovered by Mr. Boxall, a collector in the employ of Messrs. Hugh Low & Co. It is semi-pendulous in habit, and bears its flowers in clusters of three from the joints in the stems; the sepals and petals are white tipped with purplish-violet; the labellum is decorated with a fine orange disc, and both sides of the claw are streaked with violet. All the Burmese Dendrobes do well in India without much trouble, and this little gem will be a most welcome addition. It will require the same treatment as recommended in the descriptive notes to Plate II., and under this type the list of desirable Dendrobes may be further increased:—

Dendrobium crassinode (having swelled joints).—A native of Burmah. Extremely beautiful; stems from twelve to twenty-four inches long; flowers two inches in diameter, waxy white, tipped with purple; the labellum has a rich orange centre.

Dendrobium Cambridgeanum.—Native of the Eastern Himalayas. Stems thick and knotted, a foot long; foliage purplish-green, blooms on the new shoots just before completing their growth; flowers bright yellow; lip is hairy and has a rich dark crimson spot at its base.

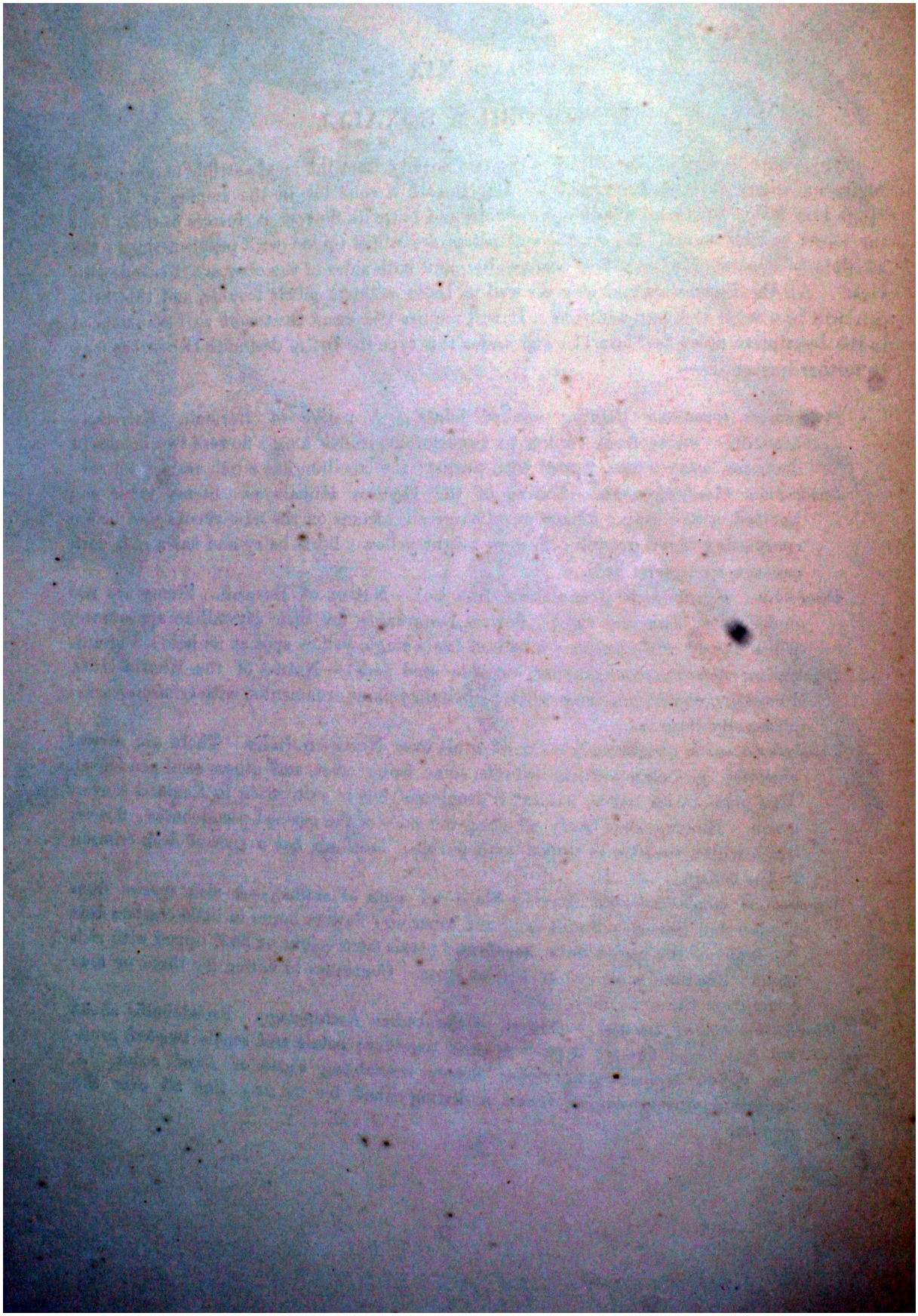
Dendrobium crystallinum (translucent like ice).—Native of Burmah. Stems are not nodose, but firm and rigid; flowers remarkable for their crystalline appearance, white tipped with purple; labellum has a single yellow spot at its base; fragrant.

Dendrobium heterocarpum (having variable seed pods).—Native of the Khasia Hills. Petals and sepals yellowish-white; labellum yellow, ornamented with crimson marks; pleasantly fragrant.

Dendrobium nobile (celebrated).—Common all over Northern India. There are several varieties, probably natural hybrids, some being erect, and others semi-pendulous. This plant in its native habitat is deciduous, but in cultivation in England is evergreen. Blooms most freely all along the sides of the ripened pseudobulbs; flowers blush-white, sometimes tipped with purple; labellum has a spot of deep crimson in the centre.

Dendrobium sanguinolentem (having blood-red spots or stains).—A rich species from Ceylon and Borneo. Stems long and tapering; flowers borne in little clusters near the point of the pseudobulb; sepals and petals fawn colour or buff, tipped with rich violet; labellum same colour, scarlet spots. Continues to flower for three or four years from the same stem.

Dendrobium tortile (twisted).—Native of the Indian Archipelago. Pseudobulbs about two feet long; flowers in pairs or three together; petals and sepals twisted, primrose colour tipped with violet, closely resembling those of *Dend. nobile*. A handsome variety named *roseum* is distinguished by its rosy tint all over the flowers.



F.W.Burbidge del. et lith.

W.Brooke Day & Son, Imp.

AËRIDES FIELDINGII. *1 spore f 3.–*

L.Reeve & Co. 5, Henrietta St. Covent Garden.

Plate XX.

AERIDES FIELDINGII.

The word "Aerides" means "air plant," in allusion to their independence of habit, deriving nourishment from the moisture in the air. It is a beautiful genus of East Indian Orchids, possessing charming qualities whether in or out of flower. Their leaves are long and gracefully curved, shining, evergreen and always pleasant to look at; their long and vigorous roots often hang pendent in the air; the flower-spike which is sometimes branching, proceeds from the axils of the leaves, and is often two feet or more in length. The flowers are waxy and lie close together all round the spike; colours most delicate; fragance powerful, so much so that a single spray of *Ae. odoratum* will perfume the whole house. They are very easy to cultivate in the tropics, growing freely on trees, they increase quickly and soon make wonderfully fine masses. Being found naturally in the valleys, they do not need very much rest, and it is important that they be supplied with sufficient moisture even during the cold weather, as if allowed to become too dry the leaves will shrivel and fall.

All the species belonging to this genus, with the single exception of *Aerides japonicum*, require the maximum amount of heat prescribed for Orchids. They are easily propagated by dividing the stem under the first root from the crown of the plant, as they readily push forth side shoots.

The species figured is popularly known as the *Foxbrush Aerides*. It is a native of Sikkim and Assam, and is frequently seen in Calcutta gardens. Its glorious branching spikes are sometimes as much as a yard long; the flowers are bright rose colour, mottled; the labellum finely expanded.

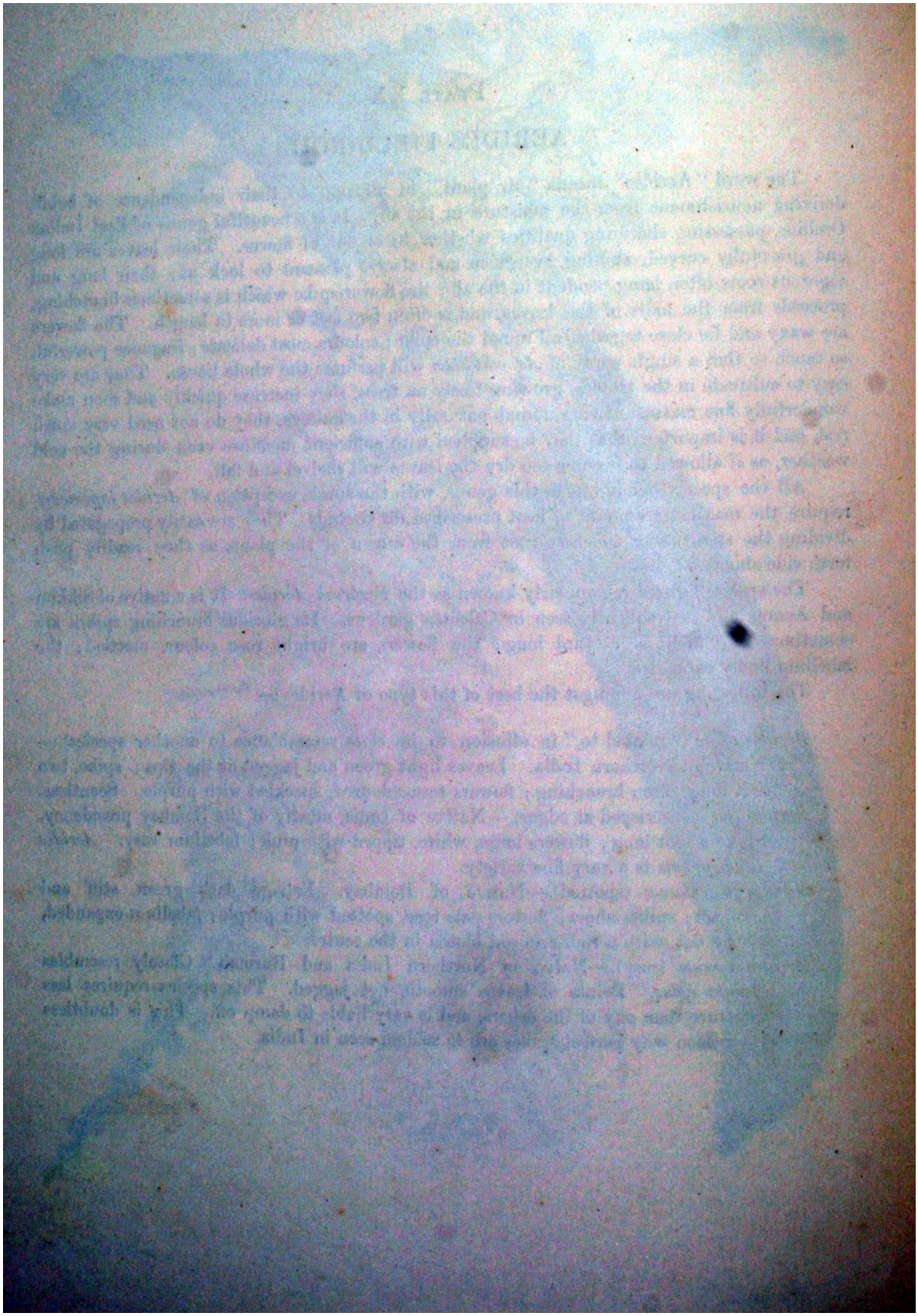
The following are amongst the best of this type of Aerides:—

Aerides affine ("related to," in allusion to its close resemblance to another species).—Native of Northern India. Leaves light green and jagged at the tips; spike two feet long, often branching; flowers rose-coloured, speckled with purple. Scentless.

Aerides crispum (crisped at edges).—Native of India, mostly of the Bombay presidency. Spike a foot long; flowers large, white, tipped with pink; labellum rosy. *Aerides Lindleyanum* is a very fine variety.

Aerides maculosum (spotted).—Native of Bombay. Foliage dark green, stiff and compact; spikes short; flowers pale rose, spotted with purple; labellum expanded, nearly flat, with a rich crimson blotch in the centre.

Aerides roseum (rosy).—Native of Northern India and Burmah. Closely resembles *Aerides affine*. Points of leaves smooth, not jagged. This species requires less moisture than any of the others, and is very liable to damp off. This is doubtless the reason why perfect spikes are so seldom seen in India.



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Vincent Brooks Day & Son

EPIDENDRUM BICORNUTUM.

L. Reeve & Co. 5 Henrietta. St. Covent Garden.

Plate XXI.

EPIDENDRUM BICORNUTUM.

A hundred years ago almost everything Orchidaceous and epiphytal was called an Epidendrum, and even now this generic name seems to have been reserved especially for the benefit of Orchids, which, botanically considered, will not fall in under any other genus. As a natural consequence, it contains a very large number of species, all natives of America, all epiphytal, all evergreen, though as varied in habit and inflorescence as are the different species of Dendrobium in the Eastern World. Some of them closely resemble Cattleyas in their manner of growth, though none can compare with them as regards the magnificence of their flowers; still, some of them can boast of fine colours and delicious scent, though the bulk of them are of but little interest to the horticulturist—only an ardent botanist would care for their inconspicuous flowers. Some have long, reed-like stems, with narrow leaves from top to bottom, flowering in clusters or dense spikes from the top of the stems. A pretty little species of this nature, *Epid. crassifolium*, is well known in Calcutta, where it blooms regularly without any trouble, potted in broken brick and lumps of charcoal. Some species do very well on a block of wood with a little moss round the root, amongst which the subject of our Plate is a favourite old plant. Its habit is very like a Dendrobium, but it produces its spike from the point of its thick fleshy pseudobulbs. Its flowers are sometimes as much as two inches in diameter, pure white, the labellum being delicately spotted with crimson. It is a native of Guiana, and is probably suitable for growing in India.

Epidendrum aurantiacum (orange).—Native of Mexico and Guatemala. Growth closely resembles *Cattleya Skinneri*. Flowers freely; bright orange; the labellum is streaked with crimson.

Epidendrum dichromum (two-coloured).—Native of Bahia. Pseudobulbs dwarf; leaves long and narrow; blooms abundantly upon graceful panicles, flowers two inches in diameter, white or pale rosy; labellum dark crimson. There are several varieties of this beautiful plant, which differ in the tint and marking of the flowers.

Epidendrum atropurpureum (deep purple).

„ *macrochilum* (broad lipped).

These two names belong to the same plant. The first is its more correct name, but it is more generally known under the second. Native of Mexico and Guatemala. Sepals and petals greenish-white, or sometimes pale rose; labellum broad, with a deep purple blotch at its base. In the variety called *roseum*, the lip is of a fine rose colour.

Epidendrum nemorale (growing in woody secluded spots).—Native of Mexico. Pseudobulbs short; inflorescence abundant in drooping panicles; petals and sepals mauve colour; labellum white, margined with rose, and striped with violet.

F.W. Burbidge del. et lith.

Vincent Brooks Day & Son. Imp.

LÆLIA PURPURATA.

L. Reeve & Co. 5. Henrietta. St. Covent Garden.

Plate XXII.

LÆLIA PURPURATA.

One of the grandest plants in cultivation, a favourite, and fortunately not a rare Orchid, from Brazil. Its pseudobulbs are stout and shining, about eighteen inches high, each bearing a solitary leaf of light green. The flower spike of three or four blossoms issues from a flattened spathe borne on the top of the pseudobulb. Each flower is about five inches across, the sepals and petals pure white, in some varieties faintly tinted with rose; the labellum is magnificent, gracefully unfolding to the view a fine expanse of the deepest purple, relieved by rich crimson streaks—a marvellous combination of the purest white with the darkest purple. No collection should be without such a gem. There are several varieties, exhibiting more or less intensity in the lip, or rosy blush in the rest of the flower. This plant requires a moderately cool climate, and would succeed best in India, grown on a block of wood sunk in a shallow pan of broken brick and charcoal.

The following are some of the finest Lælias in cultivation :—

Lælia elegans (handsome, delicate, preferable).—Native of Brazil. Its colour varies much from white to rose, with crimson or cinnamon spots upon the sepals and petals; the labellum a rich purple. *Lælia Wolstenholmiæ* is a very fine variety, the edges of the sepals and petals being stained or spotted deep purple.

Lælia grandis (imposing, stately).—Native of Bahia. Pseudobulbs club-shaped; foliage solitary, dark green; flowers nankeen colour; labellum white, marked with lilac veins.

Lælia Perrini (after Mr. Perrin, gardener to Mr. Harrison, of Liverpool, one of the earliest cultivators of Orchids).—Native of Brazil. Sepals and petals rosy purple; labellum three lobed, rich crimson.

Lælia Russelliana, a rare plant, allied to the subject of the Plate. Sepals and petals white, tinted with lilac; labellum pale yellow at the base, streaked with crimson, the disc rosy lilac.

F.W. Burbidge del et lith.

Vincent Brooks Day & Son, Imp.

VANDA SUAVIS.

L. Reeve & Co. 5, Henrietta St. Covent Garden.

Plate XXIII.

VANDA SUAVIS.

Java—one of the richest islands in the world as regards its Orchidaceous treasures—furnishes this splendid Vanda—a fine type of a large group of allied plants, all of which have succeeded well in the plains of India. Their habit of growth is neat and pleasing, even when out of bloom. Their stems are upright with distichous leaves, sometimes rigid and sometimes gracefully curved. Their fine panicles of bloom are formed at the axils of the leaves—in some species erect, towering grandly above the plant, and in others pendulous. They are easy to cultivate, growing freely in a pot filled with broken brick and charcoal, covered in with moss; or in favourable situations they will thrive naturally attached to a tree. They require plenty of water when growing, and a very moderate supply when at rest.

Vanda suavis (sweet-scented) is a tall growing plant, and possesses the good quality of flowering freely as soon as it has fairly established itself. Its flowers are white marbled and spotted with crimson. The reverse of the petals and sepals is creamy white, and the petals are curiously twisted.

Amongst the Vandas belonging to this section are:—

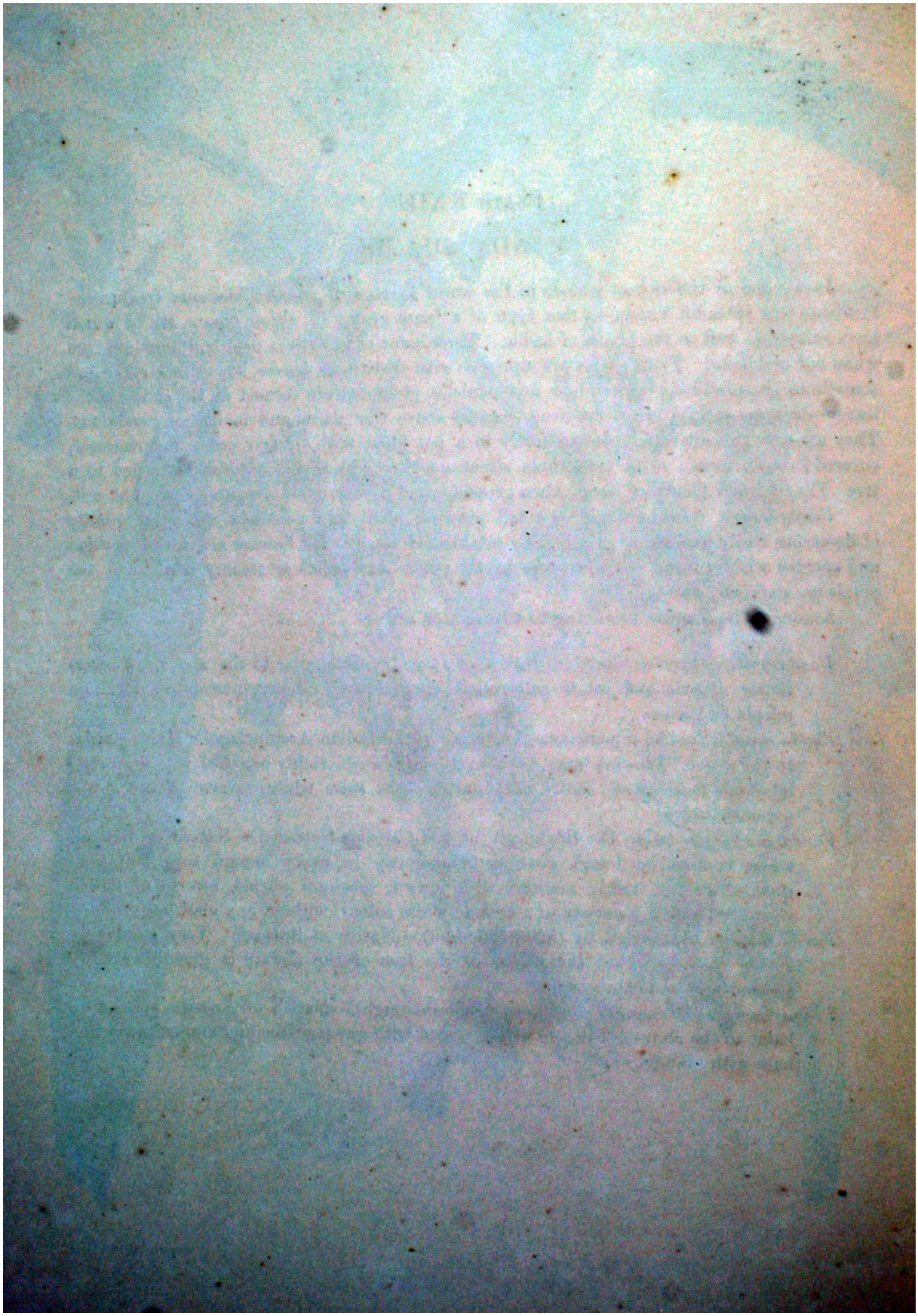
Vanda tricolor (three-coloured).—Native of Java. Very similar to the above. Flowers larger; sepals and petals pale-yellow, spotted with brownish-crimson; labellum purple and white.

Vanda insignis (noble, conspicuous).—Native of the Indian Archipelago. Habit similar to the above. Flowers large, bright yellowish-brown, richly blotched with deep-red; labellum three-lobed, centre dark purple; the sides white, reverse of the flower greenish-white.

Vanda Roxburghii (after Dr. Roxburgh, of the Calcutta Gardens).—Native of Bengal, where it may be found growing abundantly in every mango tope. Flowers greenish-yellow, richly marbled with brown, labellum purple, reverse of flower white. There is a variety of a creamy-white colour, without any marbling.

Vanda Bensoni (discovered by Colonel Benson).—Native of Burmah. Very similar to *Vanda Roxburghii*, but the colour of the face of the flowers is greenish-yellow, spotted with reddish-brown.

Vanda Denisoniana (named after Lord Londesborough).—Native of Arracan, similar in habit to the above. Flowers white, tinged with green; labellum marked near the base with orange.



F.W.Burbidge del et lith.

Vincent Brooks Day & Son Imp.

DENDROBIUM FARMERI. *Gpore 1.80 Valba 5. - 0*

L. Reeve & Co. 5 Henrietta. St. Covent Garden.

Plate XXIV.

DENDROBIUM FARMERI.

The subject of this Plate may be regarded as a type of one of the most beautiful of the groups into which the genus Dendrobium has been arranged by the late Dr. Lindley, the features of which distinguishing the individuals of this section from the other species are—their club-shaped pseudobulbs bearing leaves only at their summits, and their inflorescence, which is sometimes terminal and sometimes lateral, but always close to the top of the stem. The species figured belongs to the latter class; its pseudobulbs are round and narrow at the base but thickening upwards, becoming quadrangular at the extremity. Its leaves are broad, dark-green, and shining, and it bears glorious panicles of pale straw-colour or white flowers tinged with pink, the labellum white with a rich golden centre. It is a native of Northern India, the Khassia Hills and Burmah, and there are several varieties differing in the tint of the flowers, of which the Plate represents one of the best.

In Lower Bengal this plant is frequently seen in cultivation; it is upright in its growth, and succeeds best attached to a block sunk in a pot filled with broken brick, with the surface protected with moss.

Amongst the best of the Dendrobiums belonging to this group are the following:—

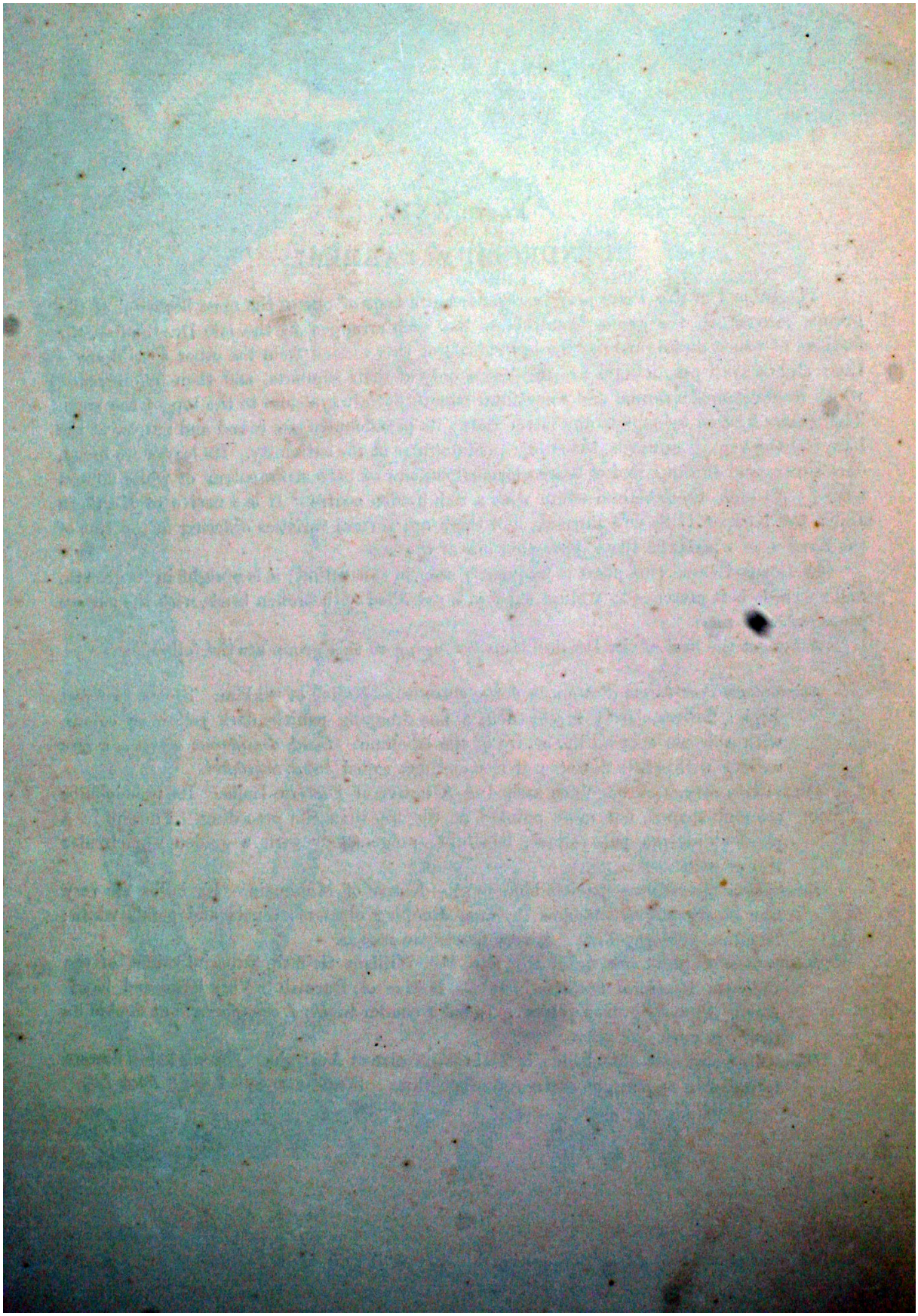
Dendrobium densiflorum (flowers in dense clusters).—Native of Sikkim. Stems two feet high; flowers closely arranged in a fine drooping panicle, dark yellow in colour, with a deeper spot on the centre of the labellum. *Dend. densiflorum album* is a rare variety with white flowers; it is sometimes called *Dend. Schröderi*.

Dendrobium chrysotoxum (golden arched).—A native of Eastern India. Its pseudobulbs are club-shaped, but more pointed at the top than the preceding. Flowers in a pendent raceme, pale-yellow; labellum orange-colour with a golden semicircular rim or arch.

Dendrobium thyrsiflorum (panicle blooming).—Native of Moulmein. Its bulbs are very like *D. densiflorum;* blooms in large drooping clusters; sepals and petals white; labellum golden yellow. A very handsome species.

Dendrobium Griffithianum (after the late Mr. William Griffith, Superintendent of the Calcutta Botanical Gardens, 1841).—Native of Burmah. Very large and handsome. Flowers golden-yellow. In habit similar to *Dend. densiflorum*, but double its size. A very rare plant.

Dendrobium speciosum (handsome, brilliant).—Native of Australia. Strong habit, flowers terminal in an upright spike, yellowish-white. Sometimes called the "*Rock Lily.*"



F.W.Burbidge del et Lith

Y.Brooks Day & Son imp.

CATTLEYA ACLANDIÆ VAR. SCHILLERIANA.

L. Reeve & Co. 5 Henrietta St. Covent Garden.

Plate XXV.

CATTLEYA ACLANDIÆ, var. SCHILLERIANA.

A good type of a very distinct group of Cattleyas, having short, club-shaped pseudo-bulbs of dwarf habit and requiring a higher degree of heat than many of the other species—consequently better adapted for cultivation in the plains of India. They all require block-cultivation, the roots protected with moss in the dry season, which should be carefully picked away at the beginning of the rains; they should have plenty of moisture when growing, and a good season of rest when the growth is completed, but care must be taken that no water becomes stagnant about the roots when grown in pots or baskets. The subject of our Plate is a native of Brazil and is represented its natural size; the inflorescence proceeds from the young growth, sometimes blooming twice in the year. Some of the Cattleyas belonging to this group have for five or six years been successfully cultivated in the Botanical Gardens at Calcutta, flowering regularly. They are there grown in pots filled with lumps of broken brick and charcoal and covered over with moss.

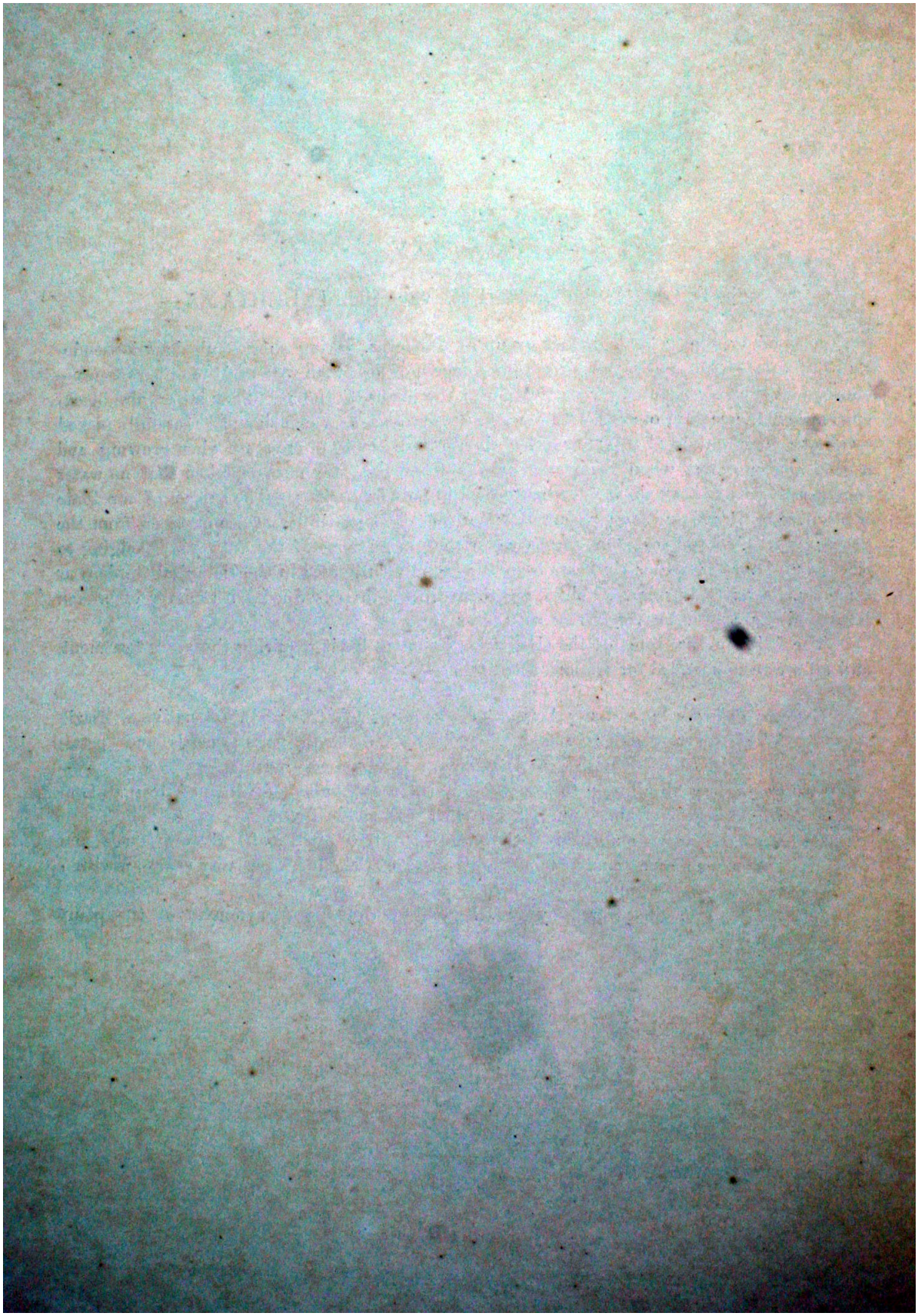
The following are some of the Cattleyas of similar habit requiring the same treatment, and all are recommended for Indian cultivation :—

Cattleya Aclandiæ (after Lady Acland, by whom it was introduced).—A native of Brazil. With short, slender pseudobulbs; leaves thick, in pairs; sepals and petals yellowish, mottled with chocolate-colour; labellum rosy purple.

Cattleya bulbosa (in allusion to the shape of the pseudobulbs).—Native of Brazil. Leaf single, leathery, and blunt; flowers rich rose-colour, fragrant.

Cattleya marginata (margined with white).—Native of Brazil. Flowers large and handsome; sepals and petals bright crimson; labellum deep rosy crimson, with a pure white margin.

Cattleya Regnelli (discovered by M. Regnell in Brazil).—A synonym of the plant figured.



F.W.Burbidge del et lith

V.Brooks Day & Son,hap

ODONTOGLOSSUM ALEXANDRÆ.

Plate XXVI.

ODONTOGLOSSUM ALEXANDRÆ.

To Her Royal Highness the Princess of Wales has this lovely plant been dedicated, though botanically it has been known as *Odont. crispum.* Of all the varied forms of floral beauty with which we are charmed, there are but very few that will claim precedence of this exquisite Orchid. It has numerous varieties, differing from each other in robustness of habit and in the markings and colours of the flowers, but all are charming. It is a native of Bogota, where it is found growing at an elevation of 8000 feet above the sea; consequently it is essentially a cool Orchid, and not suitable for tropical cultivation. In England it may almost be grown in the open air. It demands a place however in this work on account of its extreme beauty, which will commend it to cultivators in the Himalayas, who may reasonably hope to succeed with it.

It bears graceful panicles of blossom, sometimes as much as three feet in length; the individual flowers are from three to four inches in diameter, snowy-white, with golden spots upon the lip. In many varieties the flowers are decorated with rich blotches of dark crimson or faint rosy stains, and the petals delicately crisped.

Odontoglossum Bluntii scarcely differs from the subject of our Plate; many consider it but a variety. Its sepals are fringed, and the whole flower more or less shaded with peach-colour and spotted with deep crimson. Its spike is often branched, and sometimes bears as many as thirty flowers.

The following continues the list of worthy Odontoglots commenced with Plate XIII:—

Odontoglossum citrosmum (lemon-scented).—Native of Guatemala. Panicle long, bearing twenty to thirty flowers; labellum purple.

Odontoglossum gloriosum (very beautiful).—Native of New Grenada. Spike long and branching; a profuse bloomer; flowers pale yellow, almost white, spotted with brown.

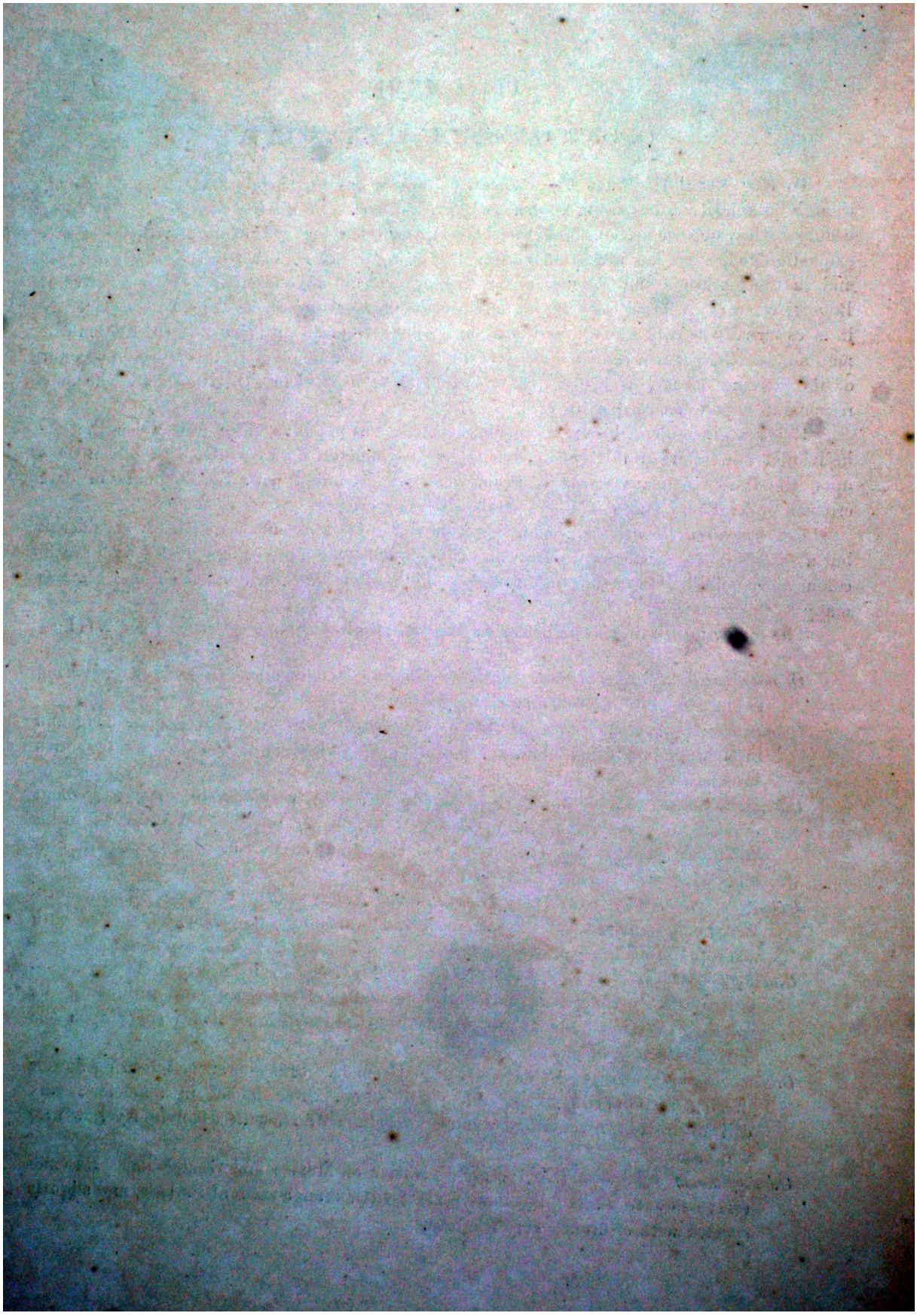
Odontoglossum Krameri.—A native of Costa Rica. A very charming species: colour delicate violet; the labellum spotted with yellow and purple. Mr. Williams, in his valuable Manual, says that this Odontoglossum as well as "*citrosmum* will bear more heat than the generality of the genus."

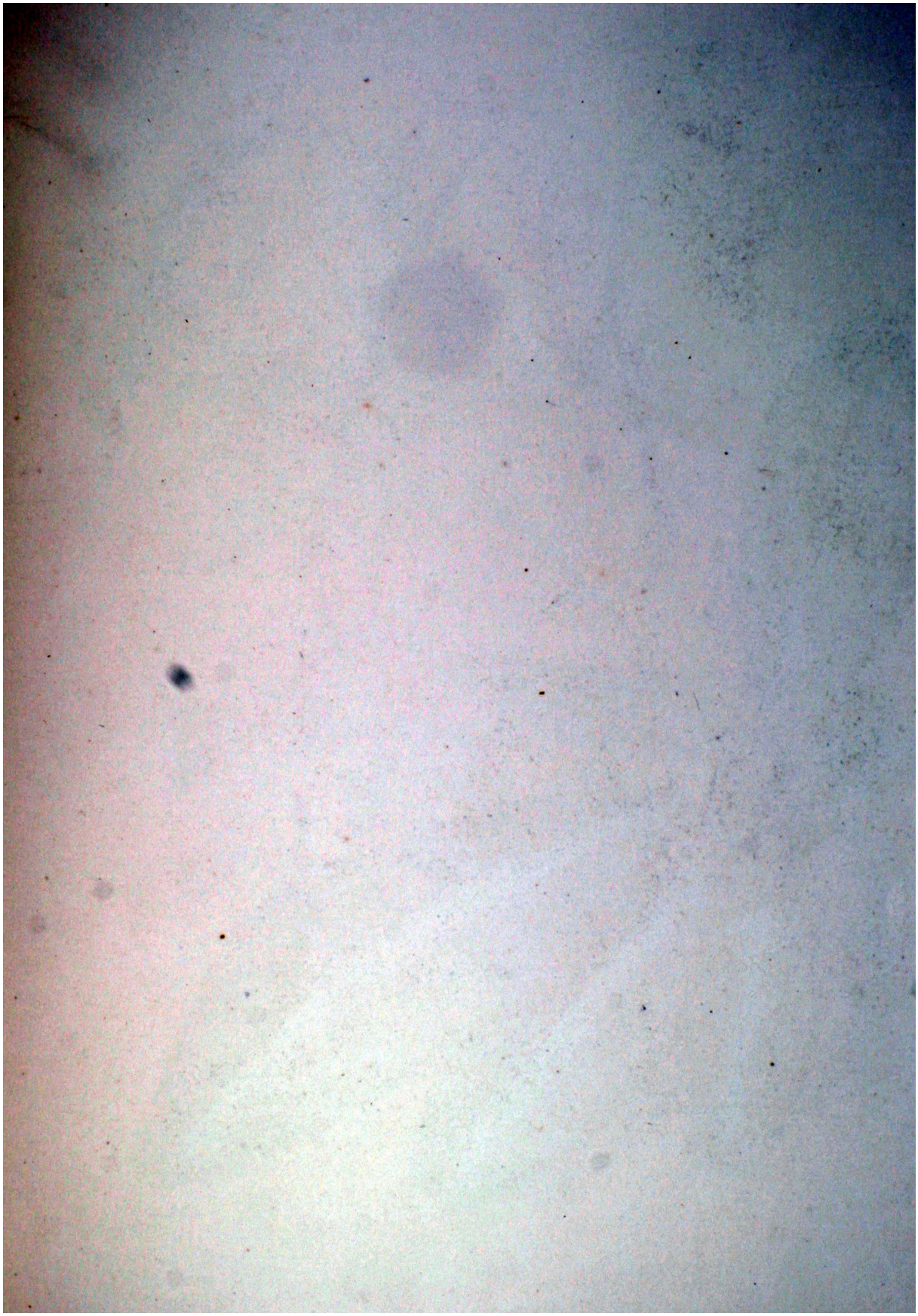
Odontoglossum nævium (freckled).—Native of the Andes at New Grenada. Pseudobulbs flattened; habit dwarf; panicles loose and branching; flowers white, spotted with crimson; labellum yellow.

Odontoglossum nebulosum (clouded).—Native of Mexico. From a very great altitude—10,000 feet. Indeed it may well be called "*nebulosum*" on account of its dwelling in the clouds, as properly as from its rosy-brown cloudy spots upon the flower, which is otherwise white.

Odontoglossum Pescatorei.—A native of New Grenada. Spikes branched, bearing flowers in great abundance; sepals and petals white, three inches in diameter; very delicate in texture; faint rosy blush; labellum white, with a blotch of yellow near the base.

Odontoglossum pulchellum (fair, pretty).—Native of Mexico and Guatemala. Racemes erect; flowers white; labellum bears a little orange stain at its base, and slightly spotted with crimson; very fragrant.





F.W. Burbidge del et lith.

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PHALÆNOPSIS ROSEA. 1/pm 4.50

L. Reeve & Co. 5, Henrietta St. Covent Garden.

Plate XXVII.

PHALÆNOPSIS ROSEA.

A favourite species of this magnificent genus, well worthy of a place in every collection, possessing as it does the admirable quality of producing a continual succession of blossom from the old flower spikes, so that it is almost always in bloom. The climate of Bengal suits it well. Its leaves are dark green in colour, somewhat rounded, and smaller in size than *Ph. amabilis*. Its spikes are branching, and about 24 inches in length; flowers bright rose, or white shaded with rose; labellum ruby-red, the side lobes rich yellow, and the upper part dark violet. It is a native of the Philippine Isles. In the notes to Plate XV. will be found a description of the mode of cultivation best suited for this genus.

The following are amongst the best of the small flowering Phalænopsis :—

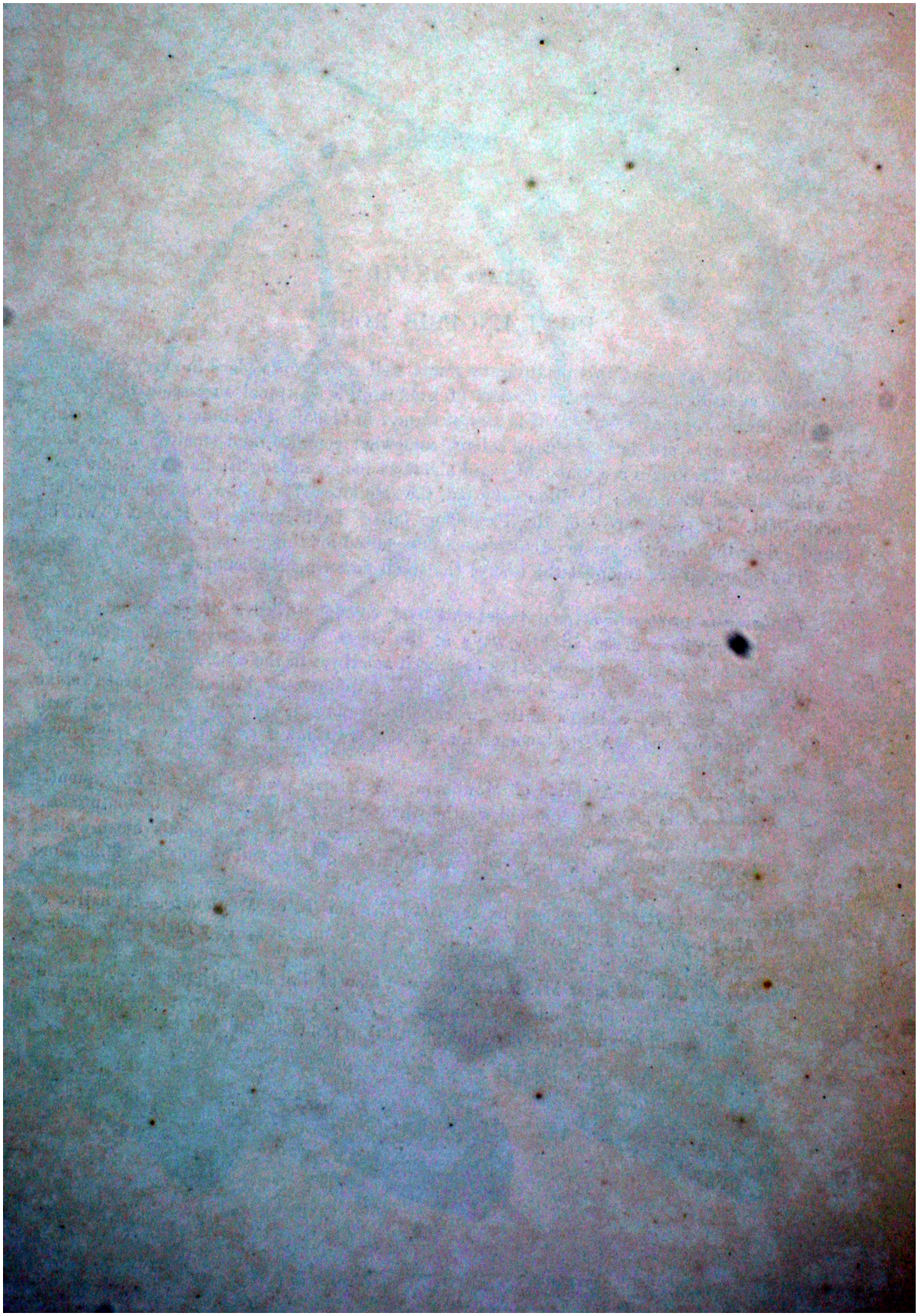
Phalænopsis amethystina (pale violet-amethyst colour).—Native of the Sunda Isles. Foliage dark green, slightly wavy at the edges; spikes short, branched; flowers white; labellum yellow at the base, rich amethyst in the centre, white at the tip.

Phalænopsis cornu-cervi (stag's horn).—Native of Moulmein. Foliage pale green; spike flattened like a stag's antler, whence its name; flowers yellowish, striped with cinnamon-red. A free bloomer, and continues to flower from the old spike for a long time.

Phalænopsis Lowii.—A native of Moulmein. A delicate plant, which not unfrequently loses all its leaves in the cold weather, hence there is danger of its becoming lost. Foliage dark green, small and delicate in texture; sepals and petals blush-white; labellum small, bright rosy purple. Requires sunlight and abundance of moisture when growing.

Phalænopsis Parishii (discovered by the Rev. Mr. Parish, of Moulmein).—A native of Moulmein. Diminutive in size; produces in abundance pretty little white flowers with a purplish labellum.

Phalænopsis Mannii (after Mr. Mann, of the Calcutta Botanical Gardens).—Native of Sikkim. In foliage somewhat similar to *Ph. cornu-cervi*; flowers yellowish buff. Almost unknown in England, but plentiful in the Calcutta gardens.



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V. Brooks Day & Son Imp.

CYPRIPEDIUM NIVEUM. J pure 1.80

L. Reeve & Co. 5 Henrietta St. Covent Garden.

Plate XXVIII.

CYPRIPEDIUM NIVEUM.

This is one of the most recently introduced members of this interesting genus, and for the beauty of its foliage and the exquisite delicacy of its flowers it has at once become a favourite. In habit it is dwarf and compact, its leaves are rigid, the upper surface dark-green freckled with satiny white, the reverse deep purple; its flowers, which are borne either singly or in pairs, are large, pure white with the faintest possible blush tint, and dotted with minute spots of violet. Its texture is as delicate and its surface as glossy as satin. It is a native of the Malayan Peninsula, and it would succeed well in the Calcutta gardens along with *Cyp. concolor*, to which it is nearly allied. Its specific name signifies "snowy-white." In the descriptive notes to Plate XII. the best treatment for these plants has already been given, as well as a list of the best panicle-bearing Cypripedia. The following are some of the species which produce solitary flowers :—

Cypripedium barbatum (bearded, hairy).—Native of Malacca. Foliage mottled; flowers brownish-purple, green and white. There are several varieties, differing in size and colour; some of them are very handsome.

Cypripedium concolor (of one even colour).—Native of Moulmein. Foliage green mottled with white, under surface densely spotted with deep purple; flowers primrose colour speckled slightly with crimson. It is said that it fares better if a few lumps of chalk are mixed in the soil.

Cypripedium hirsutissimum (most hairy).—Native of Northern India, Burmah, and the Malay Islands. Foliage light green; flowers 5 to 6 inches in diameter, purple, brown, and green; flower stalks and scapes covered thickly with long dark hairs, by which it may be immediately recognised.

Cypripedium Hookeræ.—Native of Borneo. Foliage resembles *Cyp. concolor*, but lighter; flowers brownish-yellow, or green tipped with purple; labellum yellowish, thickly spotted inside with dark purple.

Cypripedium insigne (noble, conspicuous).—Native of Northern and Eastern India. Foliage light green; flowers three inches in diameter; sepals and petals greenish, edged with white and streaked with purple. Var. *Maulei* is a great improvement upon the old *insigne*—its dorsal sepal is broader and whiter.

Cypripedium venustum (graceful, lady-like).—Native of Silhet. Foliage light green, blotched with purplish-green; flowers handsome, greenish-white, marked with green and crimson lines, and variegated with purplish-brown; the petals are fringed; labellum yellowish, green-veined, and sometimes tinged with rose. Common in the Calcutta gardens.

Cypripedium villosum (shaggy, rough, hairy).—Native of Burmah and the Malayan peninsula. Leaves light green; flowers large, 5 inches in diameter, orange-brown, beautifully clouded; the whole surface of the flower is glossy, and has a polished appearance, lasting a long time in beauty. A very desirable species.

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ONCIDIUM VARICOSUM VAR. ROGERSII. Antwerpen. 2 – 3

L. Reeve & Co. 5 Henrietta. St. Covent Garden.

Plate XXIX.

ONCIDIUM VARICOSUM var. Rogersi.

It has already been remarked in the notes to Plate XI. that many Oncidiums have been found to succeed admirably in India; this should encourage horticulturists in the tropics to extend their collections of this interesting genus, which though possessing but few species of striking variety of form or colour—the great majority of Oncidiums being yellow, marked with brown or reddish tints—yet some are exceedingly showy and attractive, producing their flowers in astonishing abundance upon sprays quite out of proportion to the size of the plant. A plant of *Oncidium macranthum* for example, which in itself may be not more than a foot high, will shoot forth its panicles of bloom to a length of twelve or fourteen feet, requiring support all along its extent—the wonder being that such a mass of bloom can be produced from so small a plant. The subject of the Plate is one of the best of the bright yellow Oncids. It is a native of Brazil, and a most abundant bloomer. Mr. Williams in his useful "manual" says its spike sometimes bears "as many as one hundred and seventy flowers which measure each about two and a half inches across. In India, the bulbous Orchids thrive best in shallow pots, filled with broken brick and charcoal, the surface protected with fresh moss. Abundance of water when growing in the dry season; careful watching during the rains, when the moss should be removed and a good season of rest in winter, at which period light is essential, and an occasional sprinkling of water to prevent the bulbs from shrinking.

In continuation of the list of worthy Oncidiums the following may be named:—

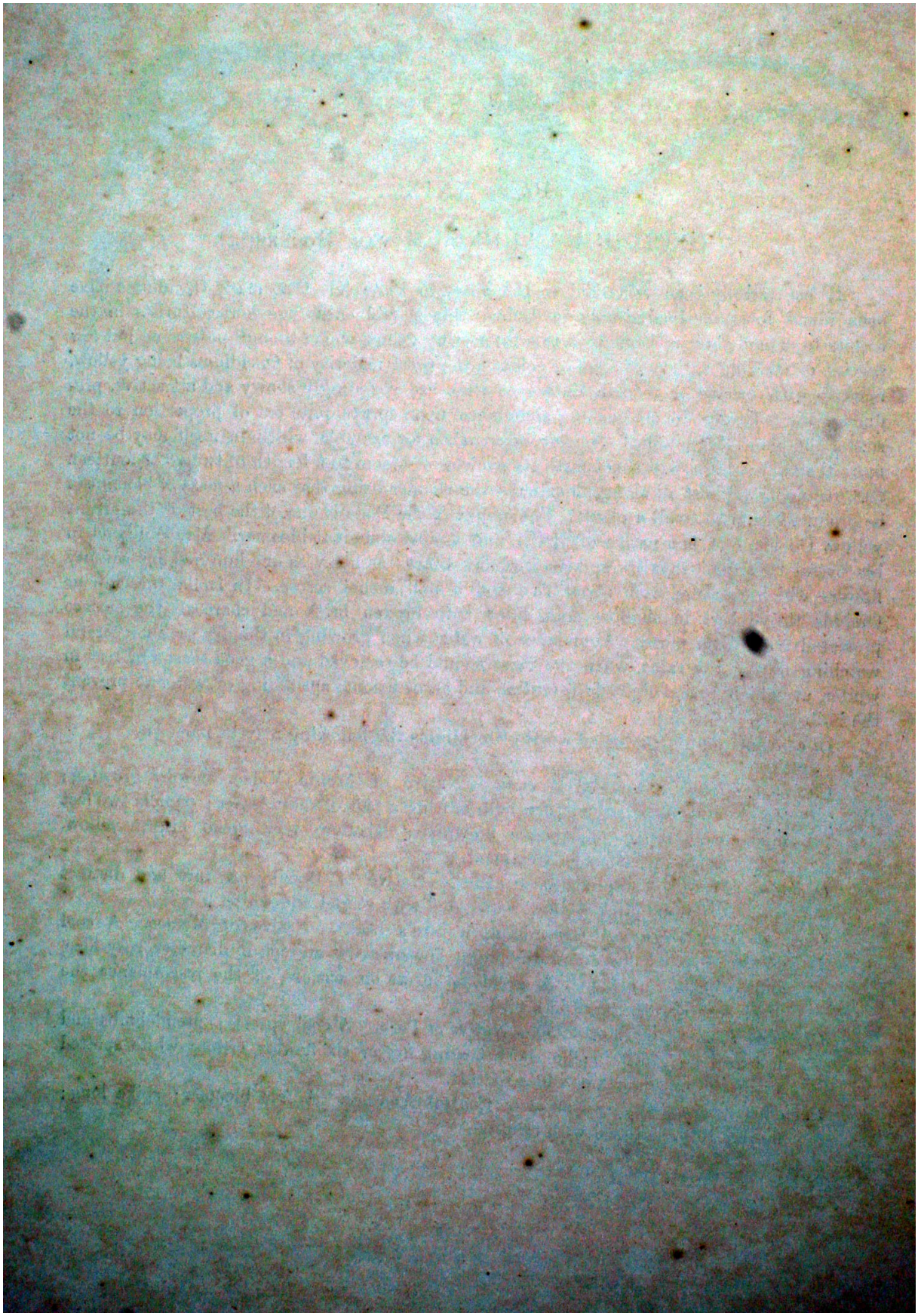
Oncidium bifolium (two leaves) *majus*.—Native of Monte Video. Dwarf growing; pseudobulbs dark green; each bulb bearing a pair of short leaves; panicle two feet in length; sepals and petals brownish; labellum very broad bright yellow. Requires somewhat cooler treatment.

Oncidium Forbesi (complimentary name).—Native of Brazil. A rare and distinct species; flowers large, yellow, variegated with scarlet and white.

Oncidium ornithorhynchum (resembling a bird's beak).—Native of Mexico. A cool species; panicle loose and drooping; flowers about an inch in diameter, rosy-lilac, and delicately scented. A great favourite on account of the resemblance the flower bears to the head of a bird.

Oncidium Phalænopsis (moth-like).—Native of Peru. A cool species; pseudobulbs and foliage dark-green; spike short, bearing five or six flowers, creamy-white spotted with crimson; labellum white spotted.

Oncidium roseum (rosy).—Native of Central America. A free bloomer; spike long; flowers rosy, speckled with crimson.



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AËRIDES QUINQUEVULNERUM. Spore 3.6 d Jarmeri 12.-

L. Reeve & Co. 5, Henrietta St. Covent Garden.

Plate XXX.

AERIDES QUINQUEVULNERUM.

The chief beauty of an Indian Orchid House in the very hottest season of the year—the month of May, consists in the bloom of the different species of Aerides, which begin to display their gorgeous racemes as the Dendrobiums go out of flower, filling the air with powerful fragrance and delighting the beholder with their gracefully drooping spikes of firm waxy flowers of the most delicate tint. The species figured in the Plate, *Aerides quinquevulnerum*, is perhaps the best of the large flowering descriptions, but all are so charming it is a difficult matter to award the palm to any one above the others which form this noble group. They all thrive so perfectly in the plains of India, that every collector should endeavour to possess the whole of them. They may be grown attached to living trees, where broken sunshine can reach them, or in pots filled with crocks, jammah (vitrified brick) and charcoal, the roots protected with moss. Water should be freely supplied in the hot weather, and during breaks in the rainy season; when at rest, only sufficient should be given to keep the plant from becoming too dry and the leaves from wrinkling.

Aerides quinquevulnerum (five wounds, in allusion to the sanguine spots upon the tips of the five perianth lobes) is a native of Manilla. The spike is dense; the flowers are white, speckled with crimson, each sepal and petal being tipped with a blotch of the same colour; the labellum is serrated, crimson in the centre, and greenish at the horn-like tip.

Amongst the other species belonging to this group are the following:—

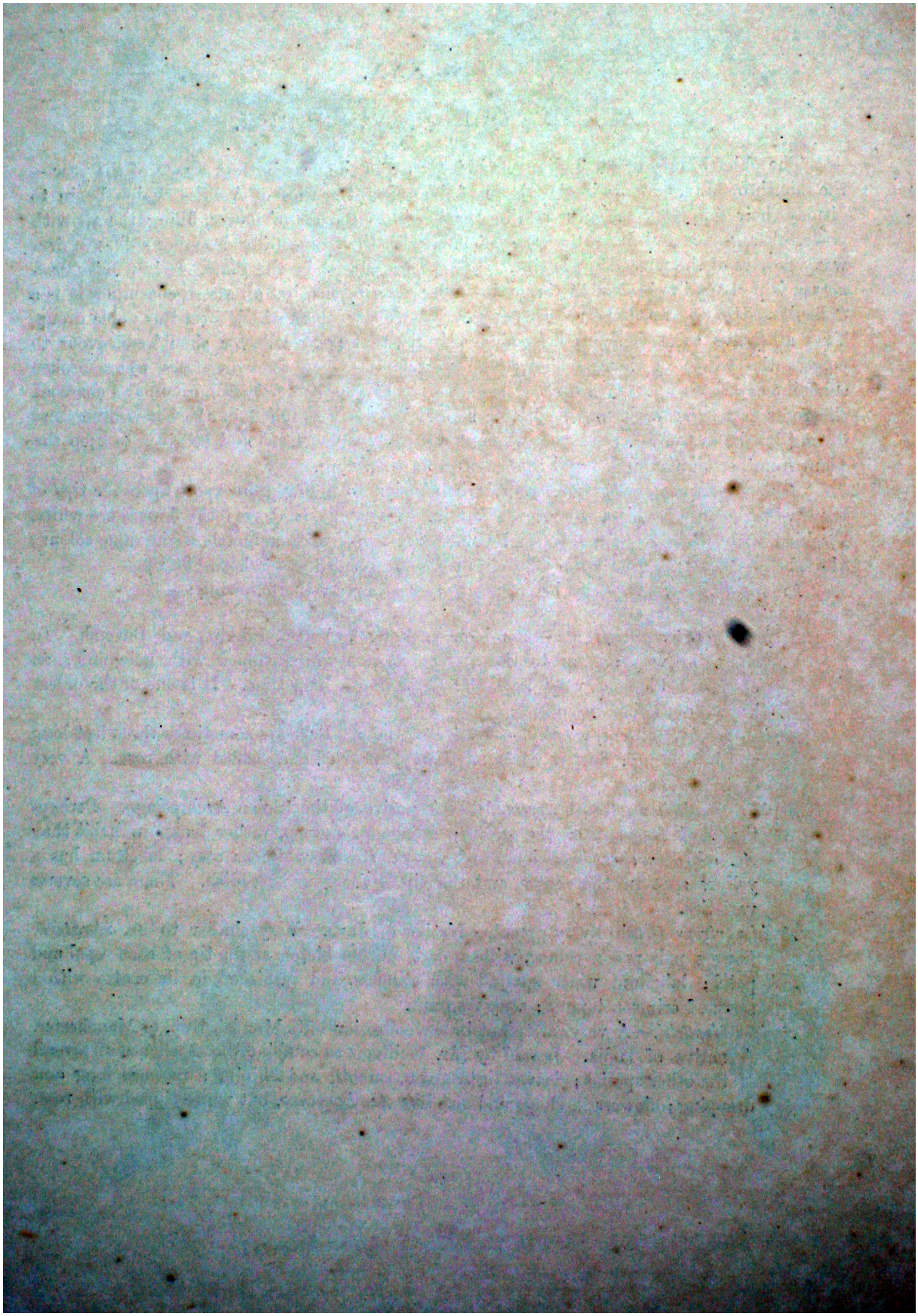
Aerides odoratum (fragrant).—Common in Bengal, Assam, Sikkim, and Burmah. In character very similar to the above; flowers white, tipped with pale-pink; an abundant bloomer, very fragrant and lasting a long time. It is one of the oldest known of Indian Orchids.

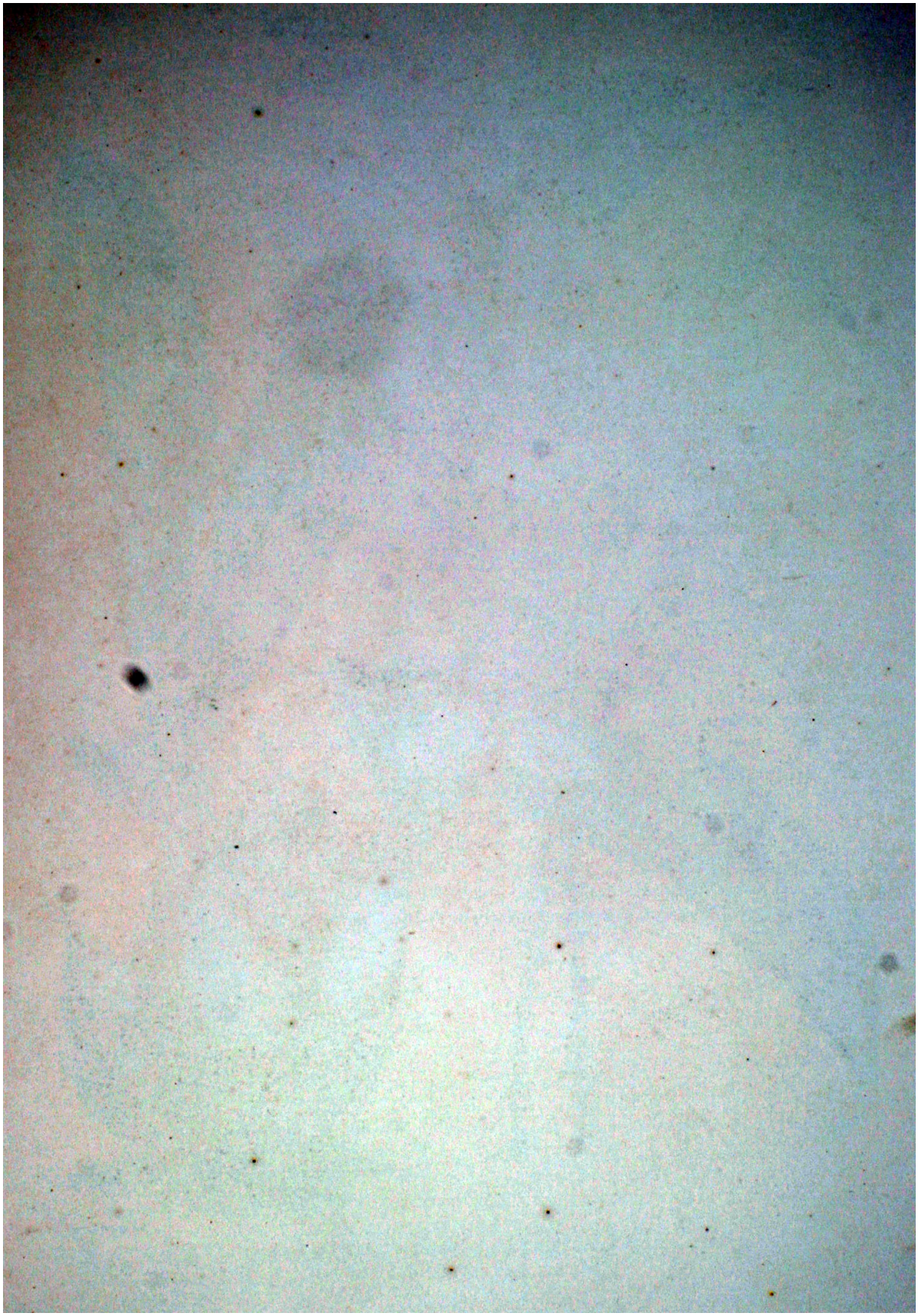
Aerides nobile (eminent, worthy).—Native of India. Racemes sometimes three feet long and branching; flowers white or creamy, speckled and shaded with rose. A very desirable species.

Aerides suavissimum (most agreeable).—A native of the Indian Archipelago. Perhaps the most fragrant of the group; foliage pale-green, rather looser in habit than *Ae. odoratum*; racemes long and wavy; flowers white or rosy; labellum has a yellow spot in the centre, and the tip of the spur is reddish. There are several varieties.

Aerides virens (fresh lively green).—Native of Java. Very similar to *Ae. odoratum*; flowers pale peach colour, with a dark purple blotch at the tip of each sepal and petal; labellum white spotted with crimson, and furnished in its centre with a serrated crimson tongue; very fragrant.

Aerides Mendelii.—A very rare plant in the collection of S. Mendel, Esq., of Manchester. A native of India. Is said by Mr. Williams to combine the excellence of several of the other species; leaves light-green, smooth and shining; racemes long and drooping; flowers in shape and size like *Ae. Larpentæ*, but white tipped with rose.





F.W.Burbidge del et lith.

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EPIDENDRUM VITELLINUM VAR. MAJUS. 1,80 – 2.50

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L. Reeve & Co. 5 Henrietta St. Covent Garden.

Plate XXXI.

EPIDENDRUM VITELLINUM MAJUS.

One of the most beautiful species belonging to this large genus, but one that could only be grown in tropical climates, at a considerable altitude above the sea. It is a native of Mexico, where it is found growing amongst moss-covered rocks, or on the lower branches of trees. Its colour is so striking and lively, and it blooms so freely, and is so easily managed, that it would be quite an acquisition to gardens situated in the Himalayan or Neilgherrie Stations, where it would doubtless prosper. It is usually grown in pots, and supplied with abundant moisture when growing; the drainage must therefore be perfect. The figure is taken from a fine variety in the collection of F. Wilkins, Esq., of Leyton. Its specific name is in allusion to the colour of the flowers resembling that of the yolk of an egg.

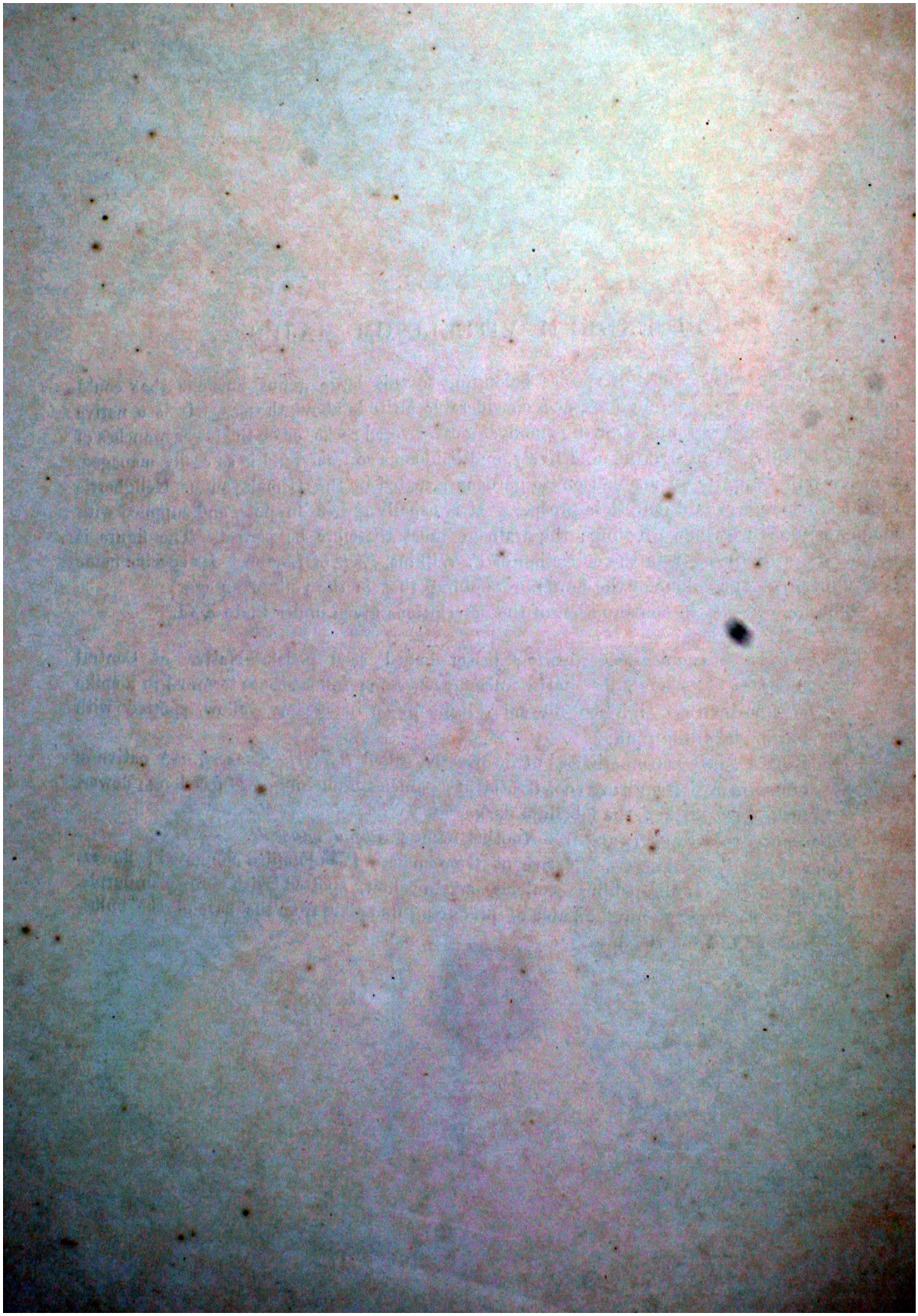
The following is in continuation of the descriptions given under Plate XXI.

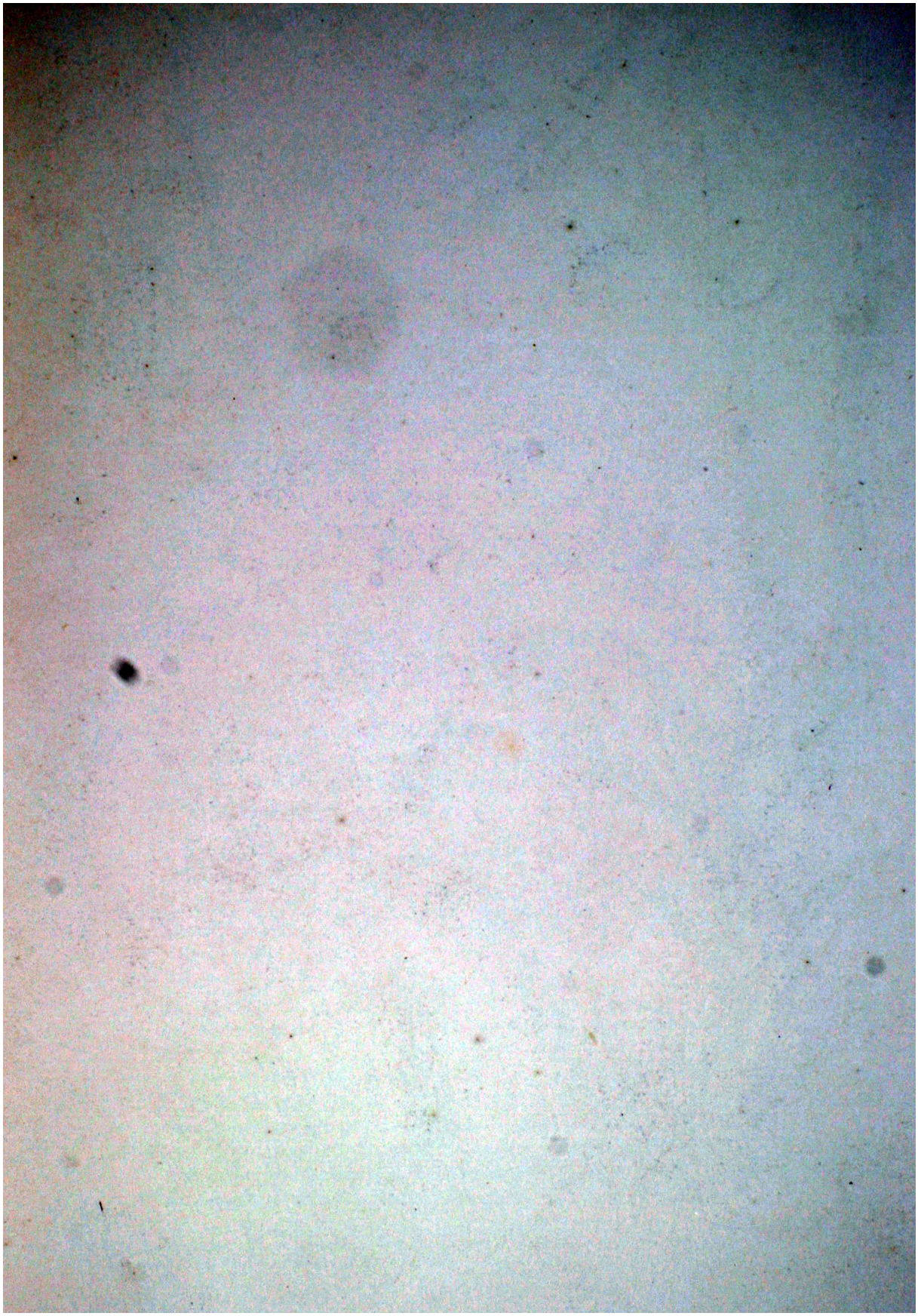
Epidendrum prismatocarpum (having prism-shaped seed pods).—Native of Central America. Pseudobulbs short; foliage evergreen; inflorescence terminal in a spike of fourteen to eighteen flowers; light green or creamy yellow, spotted with black; labellum pink.

Epidendrum Skinneri (sometimes, but incorrectly, called *Barkeria Skinneri*).—A native of Guatemala. Requiring cool treatment; panicles branching, two feet long; flowers deep rosy purple; the labellum dark.

Epidendrum verrucosum (warted).—Another name for *Epid. nemorale.*

Epidendrum Stamfordianum.—Native of Guatemala. Pseudobulbs elongated; flowers profusely on branching panicles, cream-colour, spotted with brownish-purple. This last has the unique habit of producing its spikes from the base of the bulbs, instead of from the apex.





F.W.Burbidge del et lith.

DENDROBIUM BENSONIÆ.

V.Brooks Day & Son, Imp.

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L.Reeve & Co. 5, Henrietta St. Covent Garden.

Plate XXXII.

DENDROBIUM BENSONIÆ.

Another beautiful species from Burmah, from which of late years so many Dendrobiums have been received, the fruits of the labours of Colonel Benson, of Rangoon, and the Rev. C. S. Parish, M.A., Chaplain of Moulmein, who for several years have been in the habit of devoting their holidays to botanical explorations of the rich mountains of Burmah. *Dendrobium Bensoniæ* is named in compliment to Mrs. Benson. It was discovered growing on trees upon exposed ridges. Its pseudobulbs are rigid and erect, about eighteen inches in length; flowers are borne in pairs or three together at the joints near the ends of the stems, they are often two inches in diameter—pure white—the labellum is white with a golden disc in the centre, and two blackish purple spots at the base. In some varieties these spots are stronger than in others.

The following descriptions are in addition to those already given under Plates II., XIX., and XXIV.

Dendrobium albo-sanguineum (white and blood colour).—A native of Burmah. Stems about a foot long, thick, rigid, knobby; flowers two and three together, creamy white; labellum same colour, with a deep sanguine stain in the centre. A very handsome species.

Dendrobium cretaceum (chalky).—Native of Northern India. Stems short and thick; flowers chalky-white; labellum streaked with crimson.

Dendrobium eburneum (ivory-like).—Native of Burmah. Stems rigid; flowers waxy, ivory-white.

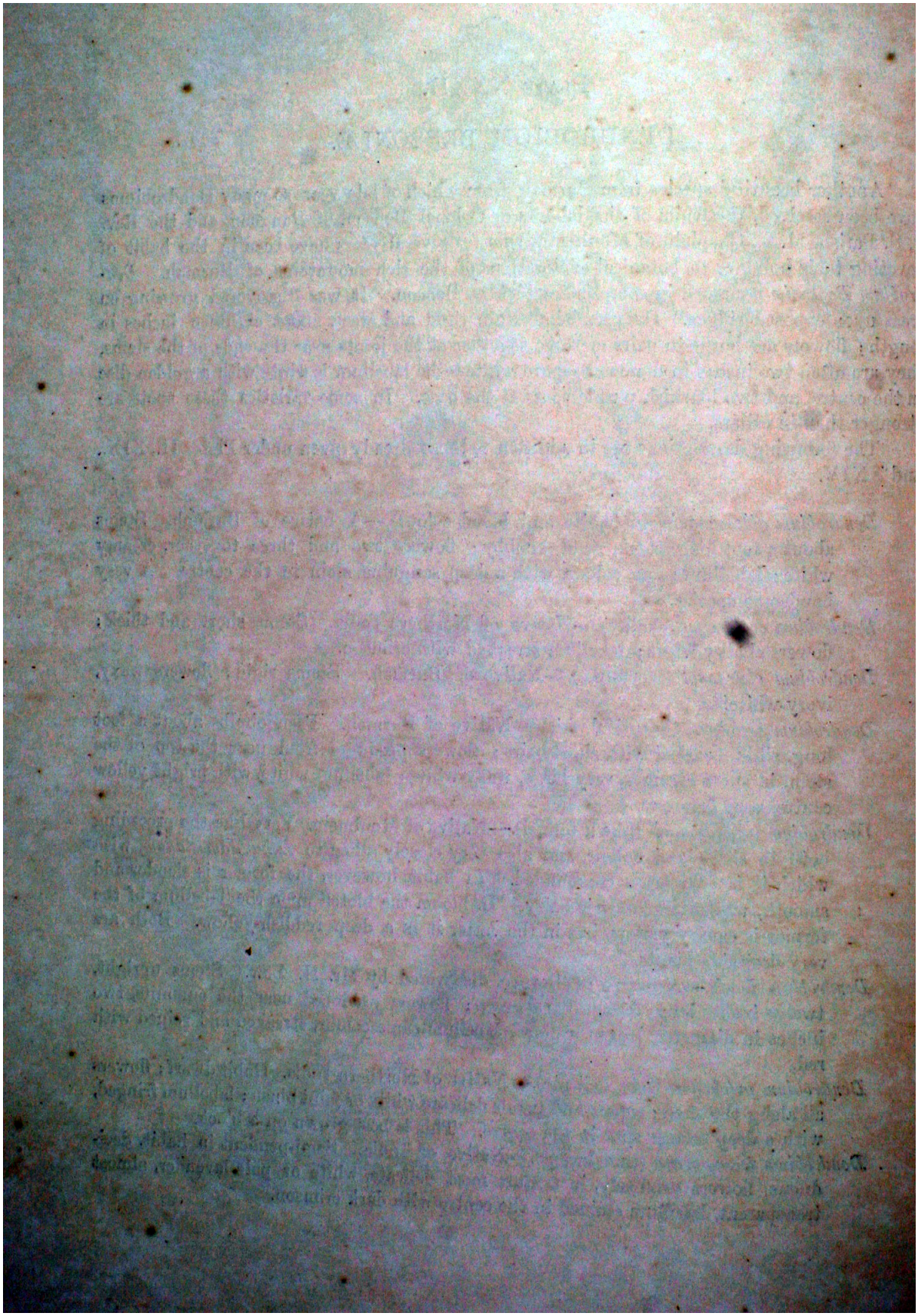
Dendrobium formosum (beautiful, fair).—Native of Burmah. Pseudobulbs about a foot long, rigid, covered with short hairs; flowers produced from near the top of the stem, in short racemes, very large, waxy-white; labellum white, with bright yellow centre, very fragrant.

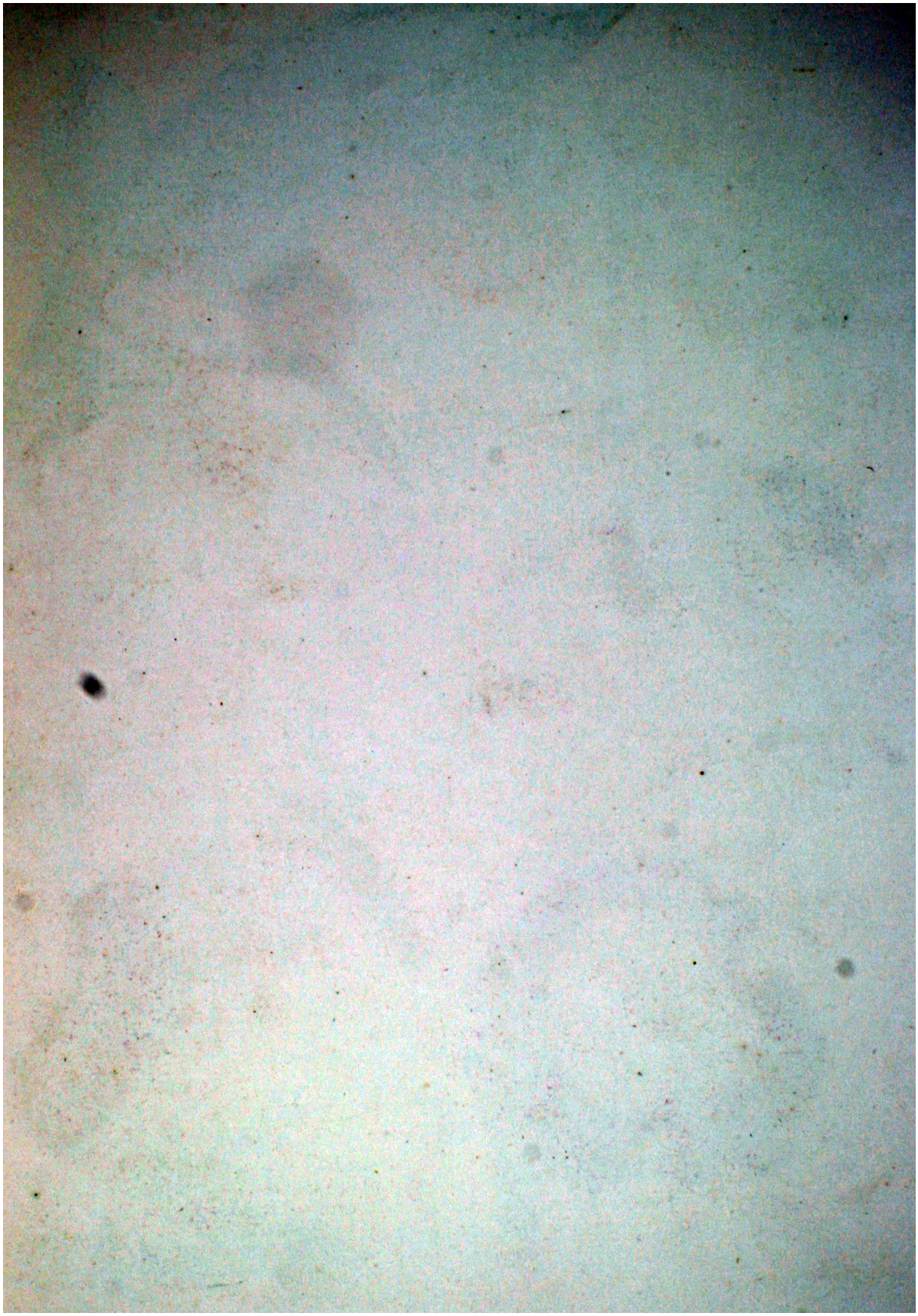
Dendrobium infundibulum (like a funnel).—Native of Moulmein. Very like the preceding both in shape and colour, and also very closely allied to *Dend. Jamesianum*, with which it is very often confounded. In habit, however, the former is slender and smooth, whilst the latter is hairy. In bloom the blotch upon the labellum of the former is canary yellow, but in the latter it is a deep reddish-yellow. Both are very desirable plants.

Dendrobium Lowii.—A native of Borneo, discovered by Mr. H. Low. Stems upright, twelve inches long, foliage dark green; flowers produced near the summits, two inches in diameter, bright yellow; labellum same colour, streaked and veined with red.

Dendrobium pulchellum (fair, delicate).—Native of Northern India. Habit dwarf; flowers all along the stem; sepals and petals delicate white or faint blush; labellum fringed, with a deep orange spot in the centre. This is best grown on a block.

Dendrobium transparens (translucent).—Native of India. Semi-pendent in habit, deciduous, flowers profusely, in texture most delicate, white or pale lavender, almost transparent, labellum stained in the centre with dark crimson.





F.W.Burbidge del et lith

V.Brooks Day & Son Imp.

CATTLEYA DOWIANA.

Hamburg 2.50 - 5

L. Reeve & Co. 5, Henrietta St. Covent Garden.

Plate XXXIII.

CATTLEYA DOWIANA.

Although this fine Cattleya has already been described under Plate XVIII., it has been deemed worthy of more special notice from the fact that of all these glorious plants it is one of the best suited for cultivation in the plains of India, being a native of Costa Rica, and taking a greater degree of heat than any of the other large-flowering Cattleyas. In the Botanical Gardens of Calcutta several Cattleyas have been bloomed year after year, and this noble species would be a most satisfactory addition to the exotics which have now become quite acclimatized in India. The success which has attended their cultivation in these gardens should encourage amateurs to turn their attention to a genus which so well repays care and trouble.

In continuation of descriptions under Plates XVIII. and XXV. :—

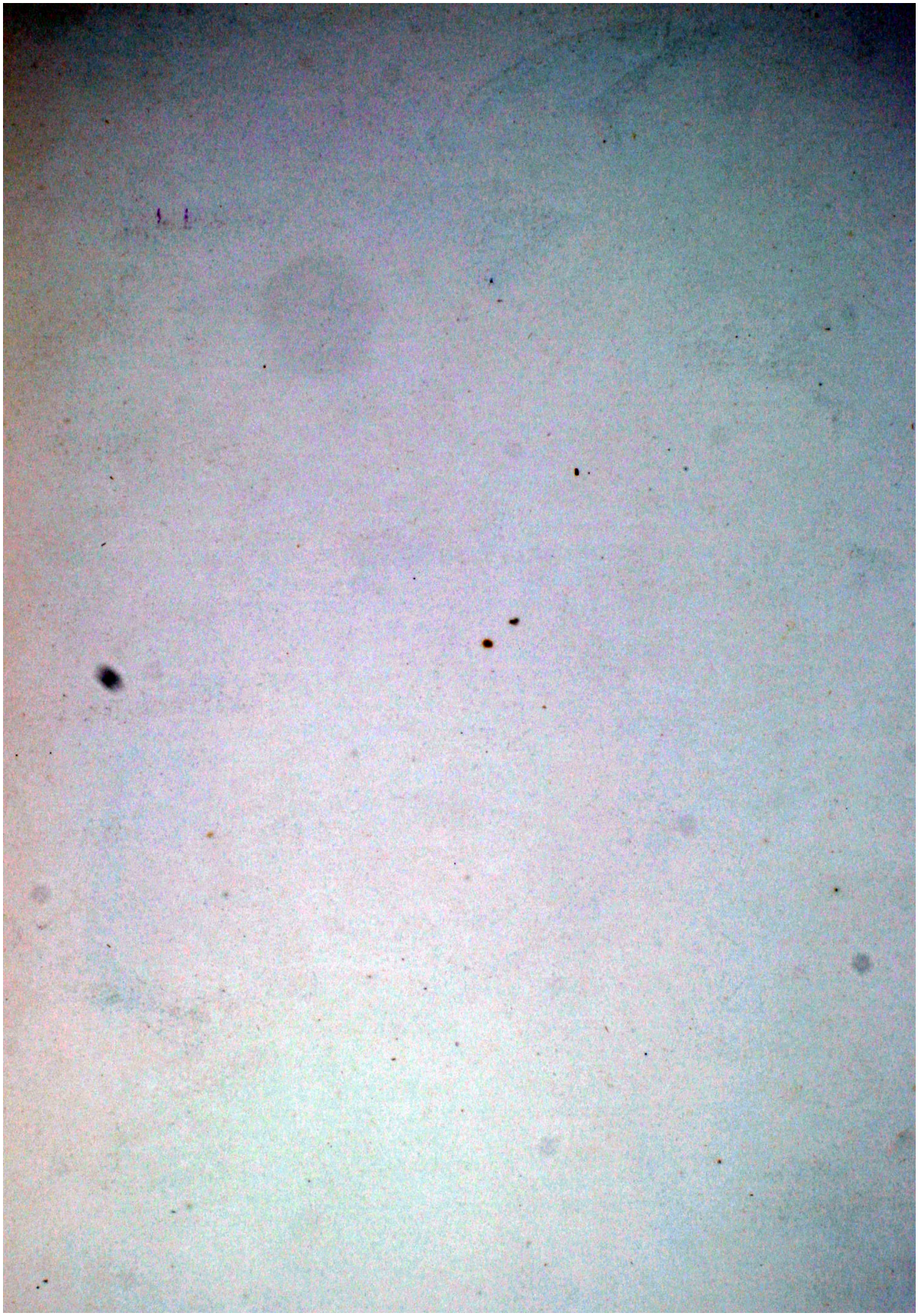
Cattleya amethystoglossa (amethyst-coloured lip).—Native of Brazil. Stems two to three feet high, slender, surmounted by two dark green shining leaves ; spikes of six or eight flowers, four inches in diameter, white or pale-rose, spotted with rosy purple ; labellum rich dark purple. This species varies considerably.

Cattleya guttata (spotted).—Native of Brazil. Stems eighteen inches to two feet high, slender habit ; flowers eight or ten in a spike, greenish-yellow, splashed all over with dark crimson ; labellum white, shaded with purple.

Cattleya Leopoldii (after Leopold I., King of the Belgians, who was an enthusiastic cultivator of Orchids).—Native of Brazil. Closely allied to *C. guttata*, but superior in producing a much greater number of flowers on a single spike ; sepals and petals brownish-green, spotted ; labellum deep purple.

Cattleya Harrisoniæ (complimentary).—Native of Brazil. Stems twenty inches high ; flowers rose colour ; labellum pale yellow ; an abundant bloomer ; a variety called *violacea* is delicate violet instead of rose.

Cattleya Skinneri (complimentary).—Native of Guatemala. Stems twelve inches high ; flowers large, deep rose colour ; labellum crimson.



F.W. Burridge, del. et lith.

V. Brooks Day & Son, Imp.

VANDA CŒRULEA.

L. Reeve & Co. 5, Henrietta St. Covent Garden.

Plate XXXIV.

VANDA CÆRULEA.

It is a singular fact that whilst every other colour and tint may be found amongst the various genera and species of this great order, blue is extremely rare, true blue almost unknown; the beautiful Vanda figured in the Plate, although its name indicates that colour, is more properly a pale lavender than a blue flower, but even that hue is so distinct and uncommon that *Vanda cærulea*, and the smaller but not less charming *Vanda cærulescens*, will ever retain their places as prime favourites in every well-chosen collection.

Vanda cærulea is only found in the Khassia and Jynteah Hills to the South of Assam, and is becoming very rare; it is extremely local in its character, growing upon the trunks and branches of trees fully exposed to the sun and air, and never in dense shady forests. Its foliage is dark green, short and but slightly curved; the points of the leaves are jagged and irregular; the flower-spike is erect, bearing from ten to fifteen large flowers, five inches in diameter; the sepals and petals almost uniform in size and of a delicate lavender colour; the labellum is small and of a deep purple colour.

The plant from which the Plate was figured is a very handsome specimen in the collection of Messrs. James Veitch and Sons, of Chelsea, to which, from want of space, full justice cannot be done; the flowers appear more crowded together than they should be, but the vignette will afford a better idea of the character of this fine plant, upon which were eighteen flowers on a single spike.

In Bengal *Vanda cærulea* will grow well upon a tree in the open air, block cultivation suits it best; but in order to ripen its wood well for flowering it should have full exposure to the sun during all the cold weather months.

The following will complete the list of Vandas worthy of cultivation :—

Vanda Batemanii.—A native of the Philippine Isles. A magnificent plant with powerful stems, thick rigid erect leaves; long spike bearing large leathery flowers, yellow spotted with crimson on the face, and dark rose on the reverse; labellum dark crimson.

Vanda cærulescens (bluish).—Native of Burmah. Foliage short, erect, and dark green; spikes very long, bearing as many as twenty flowers of the same colour, but darker than *Vanda cærulea;* labellum dark blue; a beautiful little Orchid.

Vanda cristata (crested).—A native of Sikkim and the Eastern Himalayas. In character very like *Vanda Roxburghii*, but the flowers are different; sepals and petals greenish; labellum broad, crested, buff coloured barred with purple.

Vanda gigantea (the greatest).—Native of Burmah. A shy bloomer, it will not produce flowers at all for years after removal. Its foliage is very fine and massive; leaves three inches broad, light green and wavy; flower-spikes produce twelve or fourteen thick flowers, yellowish blotched with brown and crimson.

Vanda Lowii (after Mr. Hugh Low).—Native of Borneo. It would perhaps be more strictly correct to name this fine plant *Renanthera Lowii*, though it is usually called a Vanda. It is a most difficult plant to carry, a few days' voyage is almost enough to kill it. Out of a number of plants sent to the writer from Singapore to Calcutta, the only specimens that reached in a living state were those which had been established in cocoa-nuts, and suspended in a cabin of the steamer; these plants are now in the Botanical Gardens where they flower every year. Its growth is upright, and from the axils of its dark green leaves it produces a long pendant flower-spike, which reaches the astonishing length of ten or twelve feet; close to the base of each spike are produced two tawny-yellow flowers spotted with crimson; there is then a space and the inflorescence recommences, but in a totally distinct form, the rest of the flowers being reddish-brown and yellow, in blotches like tortoiseshell. Botanists are quite at a loss to account for this singular phenomenon of two different kinds of flower appearing on one spike.

Vanda teres (quill-like, cylindrical).—A native of Northern India. Of very distinct habit. The foliage is cylindrical, like green quills, or the leaves of the onion; its flowers are very handsome; the spikes are erect, each bearing six or eight large flowers, rosy-purple in colour; the labellum is bright orange streaked with deep crimson. In Bengal this plant grows freely and flowers abundantly exposed to the full sunshine all the year round; it is grown round an upright post, seven or eight feet in height. It is said to be a shy bloomer in England, but this the writer believes to be for want of constant direct sunlight and a long rest in winter.

F.W.Burbidge, del. et lith.

V.Brooks Day & Son Imp.

THUNIA (PHAIUS) BENSONIÆ. Spore 2.50

L. Reeve & Co. 5. Henrietta St. Covent Garden.

Plate XXXV.

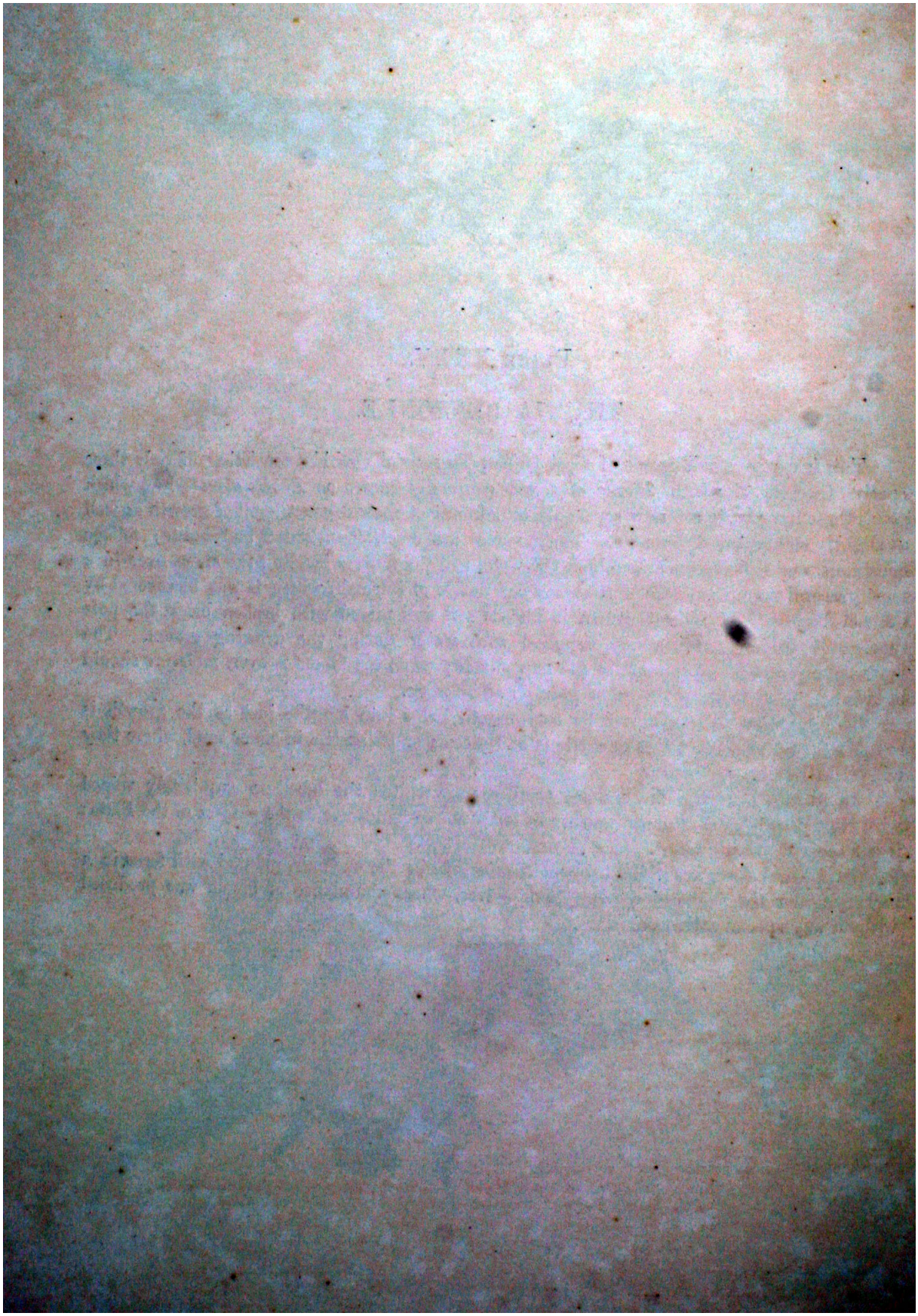
THUNIA BENSONIÆ.

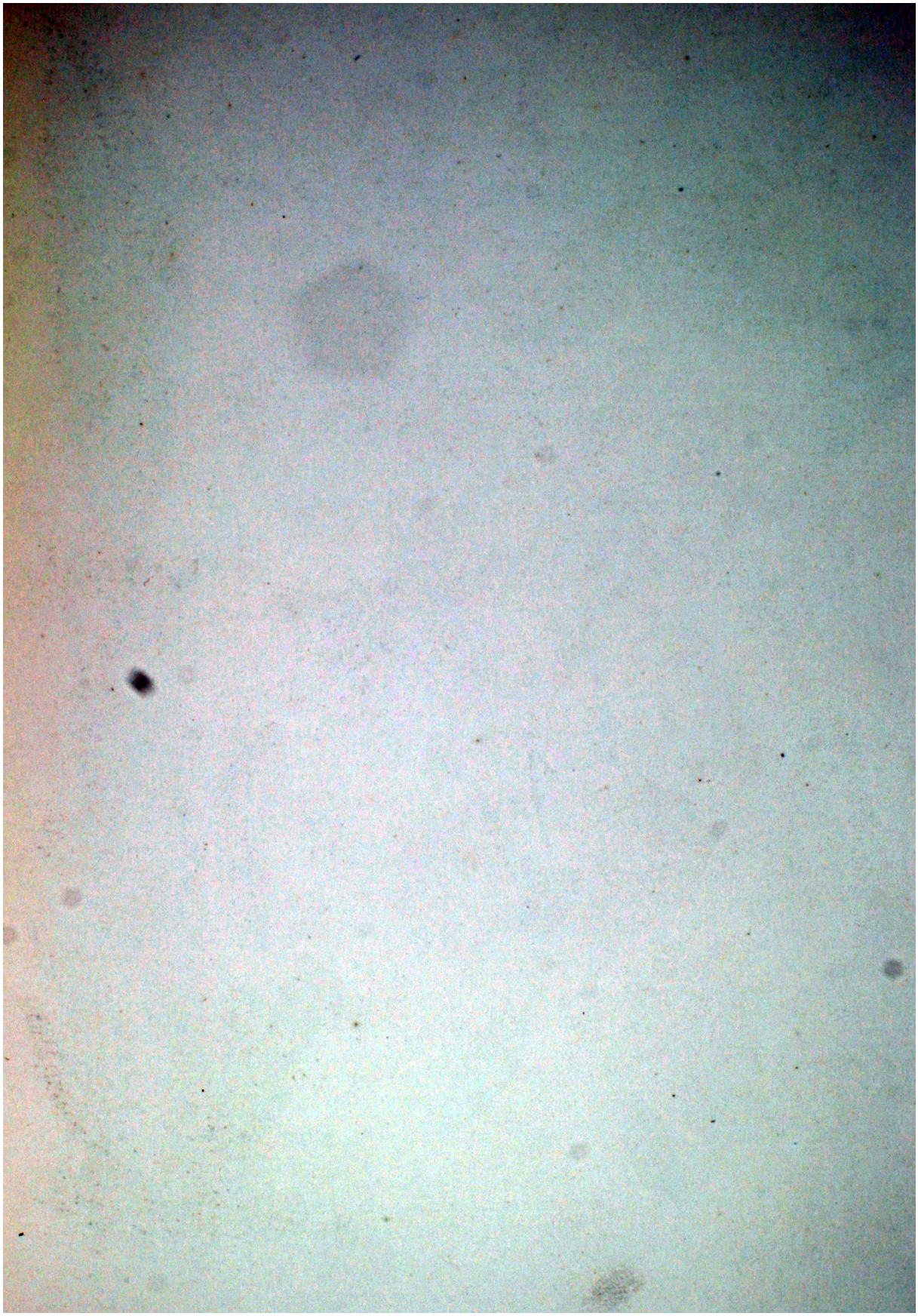
This is a very small genus of East Indian Terrestrial Orchids, consisting of only three species, the first of which, *Thunia alba*, was originally known as *Phaius albus*—from which genus these few plants are now separated, on account of their distinct habit of growth as well as slightly structural differences. Their stems are erect, fasciculated and terete; foliage deciduous, and inflorescence terminal, the weight of the flowers bending the stems over in a most graceful manner. *Thunia Bensoniæ* is a native of Burmah, where it was discovered by Colonel Benson. It is best grown in fibrous soil well mixed with broken brick, the pots thoroughly drained, and amply supplied with water during the growing season. The flowers are produced at the end of the new shoots; when the bloom is over, moisture should be reduced, so as to keep the bulbs plump and no more.

Thunias may be propagated by cutting old bulbs into lengths just as the growth is completed, and treating them as cuttings of Dracæna or Poinsettia in silver sand, where they will strike freely.

In *Thunia alba* the flowers are smaller, pure white; the labellum exquisitely veined with close purple lines, though neither so large nor so handsome as the subject of the Plate; it is a most charming plant.

In Bengal the author has grown *Thunia alba* in the open air, planted with ferns in a rockery under the shade of a large Mango tree, where abundance of bloom was produced without any special attention.





F.W.Burbidge, del et lith.

V.Brooks Day & Son, Imp.

ODONTOGLOSSUM VEXILLARIUM. Hamburg 2.50 - 3.50

L.Reeve & Co. 5 Henrietta St. Covent Garden.

Plate XXXVI.

ODONTOGLOSSUM VEXILLARIUM.

Beautiful as are most of the members of this distinguished family, the subject of the Plate, for which we are indebted to the kindness of Mr. Rucker of Wandsworth, surpasses them all, both as regards the size of the individual flowers and their exquisitely delicate tint. It is moreover one of the most recent introductions and at present very rare. A native of the mountains of New Granada, at a considerable elevation, it is classed amongst cool Orchids, and hence suitable only for cultivation in the Hill Stations of India. It is worthy of remark that Mr. Rucker's plant had four flower-spikes to one pseudobulb, bearing in all fifteen splendid flowers—ample proof of its free blooming qualities. There are several varieties already known; by way of illustration two of the best have been figured in the Plate, and it is not too much to say, that it bids fair to become one of the very best Orchids in cultivation.

The principal feature of this magnificent plant is its broadly expanded labellum, which sometimes measures as much as from three to four inches across; in colour it is a fine rose or rosy lilac, more or less margined with white, the base of the lip being stained with gold and streaked with crimson, and well does it merit its name from *vexillarius*, "a standard bearer."

In continuation of the descriptions of worthy Odontoglots already given, the following may be named, all of which bear large flowers, upon somewhat shorter spikes than those described under Plates XIII. and XXVI:—

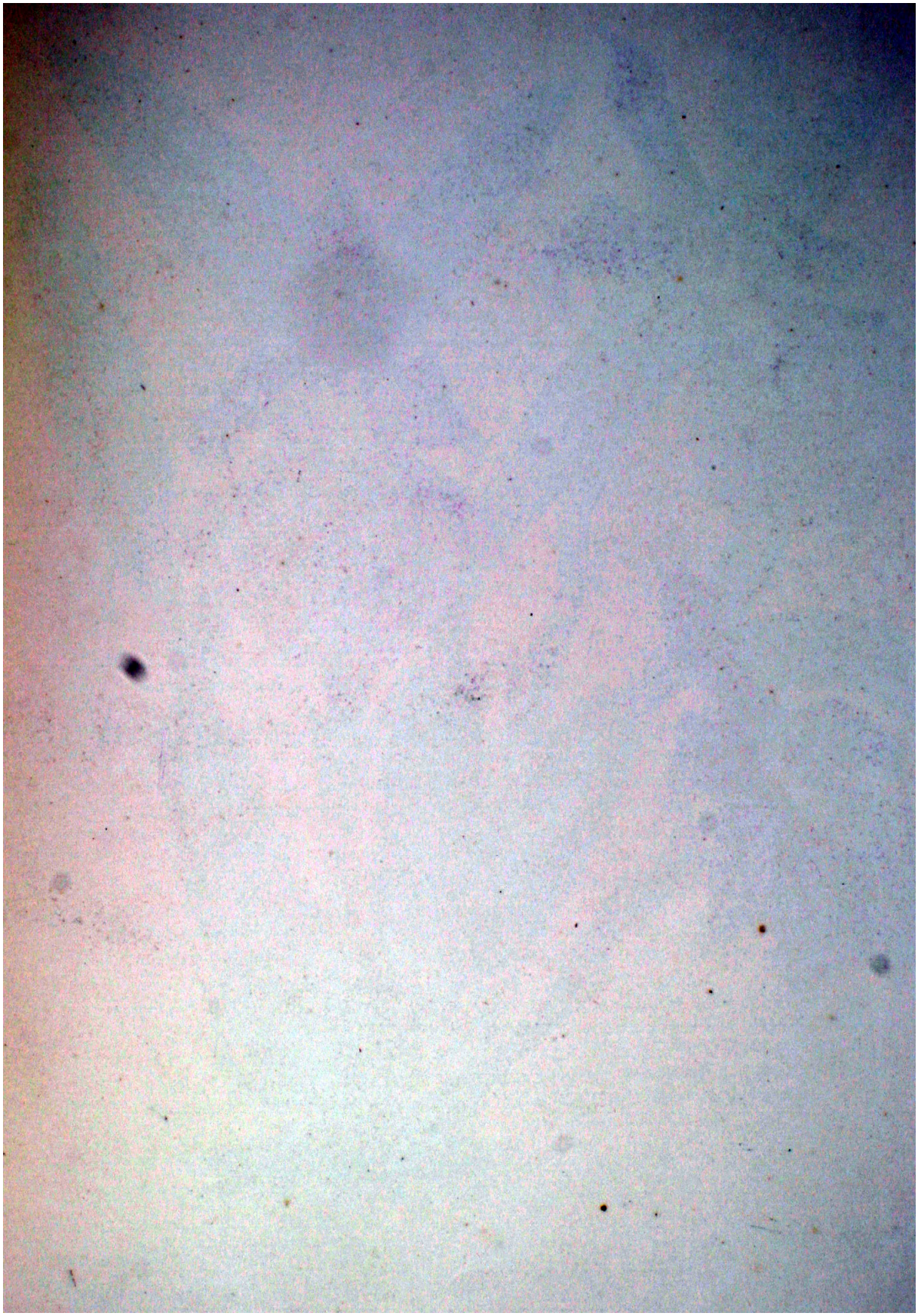
Odontoglossum Cervantesii (complimentary name).—Native of Mexico. Spike six inches long, flowers two inches in diameter, pale rose, speckled with crimson; labellum white.

Odontoglossum maxillare (resembling the jaws of some insects).—Native of Mexico. Flowers white, spotted with deep crimson at the base of sepals and petals.

Odontoglossum phalænopsis (moth-like).—Native of Ecuador. Flowers in short clusters two inches in diameter, sepals and petals white, marked with rose; labellum deep crimson margined with white. This species requires more heat than any of the others, and would possibly succeed in the climate of Calcutta.

Odontoglossum Roezlii (after M. Roezl, the successful discoverer of several of the best of the New Granada novelties).—Flowers resemble those of *Odont. vexillarium*, but are white with a purple blotch at the base. A rare plant.

Odontoglossum Rossi (complimentary name).—Native of Mexico. Habit, dwarf. Flowers, two or three together on a short spike, three inches in diameter—white ornamented with transverse crimson bars; labellum white, the column sometimes purple, in other varieties orange.



F.W.Burbidge. del. et. lith.

V.Brooks Day & Son. Imp.

MILTONIA MORELLIANA

L. Reeve & Co. 5 Henrietta St. Covent Garden.

Plate XXXVII.

MILTONIA MORELLIANA.

Miltonias occupy a position very near to Oncidium and Odontoglossum, the distinction being that the labellum is not furnished with the protuberances described under Plates XI. and XIII., otherwise their flowers are very similar in character. They are all epiphytal in habit, with pale green foliage; short and somewhat flattened pseudobulbs, from the base of which proceed the flower-scapes, producing either solitary flowers of considerable size, or two to six together, seldom in long showy panicles.

Brazil is their native place and they will bear as much heat as Cattleyas, but are very impatient of damp, as both foliage and pseudobulbs are delicate and easily rot, and being usually grown in pots filled with charcoal and broken brick, attention must be paid to the drainage, which must never be allowed to become choked. They also like shade when growing.

Miltonia Morelliana is one of the best, especially the darker varieties; it is not easy to find deeper, richer tints. Its sepals and petals are dark purple; the labellum finely expanded, lighter in colour, veined and shaded with rosy carmine. It flowers during the Autumn months.

Miltonia candida (satiny white).—A native of Brazil. Its spike sometimes bears five or six flowers; sepals and petals yellowish and brown; labellum white marked with pink.

Miltonia Clowesii (after the late Rev. John Clowes of Manchester, who bequeathed his fine collection of Orchids to Kew).—Native of Brazil. Flowers four to six on one spike, three inches in diameter; sepals and petals yellow, marked with brown; labellum lilac and white.

Miltonia Regnelli (after M. Regnell of Brazil, the discoverer).—Flowers three to six on a spike; sepals and petals white; labellum delicate rose. A variety of this plant named *purpurea* is a great improvement, the flowers are large and of a rosy tint and the labellum deep purple.

Miltonia spectabilis (worthy of special notice).—Native of Brazil. Flowers solitary, three to four inches in diameter; sepals and petals broad, greenish white; labellum violet or crimson, margined with white; foliage yellowish-green.

Miltonia Warscewiczii.—Native of Peru. This plant is sometimes called *Odontoglossum Weltoni*, and at other times *Oncidium fuscatum*, though really a Miltonia; in habit it is much more like the panicle-bearing genera, having sometimes fifteen flowers on a single spike; sepals and petals light brown tipped with golden yellow; labellum violet-purple, margined with white and with a yellowish blotch in the centre.

F.W. Burbidge del et lith.

V. Brooks Day & Son Imp

PILUMNA FRAGRANS. Antwerpen 9.80

L. Reeve & Co. 5 Henrietta St. Covent Garden.

Plate XXXVIII.

TRICHOPILIA (Pilumna) FRAGRANS.

This beautiful little plant is a somewhat recent introduction from tropical America, its principal features being the exquisite purity and delicate texture of its flowers, and their delicious fragrance. Its pseudobulbs are sheathed, and bear a single shining leaf; the flower-spike proceeds from the base of the bulb, and the flowers, four to six in number, are about two inches in diameter; the column has a fringed hood at the back of the anther bed, whence its generic name.

These plants are generally considered cool Orchids, though several species are natives of the West Indian Islands, and therefore accustomed to tropical heat. They are termed "subepiphytic"—that is, *almost* with an epiphytal habit, and are usually grown in pots filled with peat and moss. They should stand well above the rim of the pot, because in many species the flower-spike takes a downward direction, so that the plant when in good bloom appears as though fringed round the base with flowers. They require a moderate supply of water when growing, but only sufficient to keep the bulbs plump when at rest. Drainage must be carefully looked to as they are impatient of standing wet.

Trichopilia coccinea (scarlet).—A native of New Granada. Habit dwarf; sepals and petals brownish-yellow, twisted; labellum rosy-crimson, broadly margined with white, into which the richly coloured veins radiate.

Trichopilia crispa (crisped at the edges).—Native of Costa Rica. A very handsome plant, stronger in habit than the above; all the sepals and petals wavy at the edges, pale crimson in colour, sometimes margined with white; labellum the same colour, but deeper in tint, and externally white. The same bulbs produce flowers twice in the year.

Trichopilia Galeottiana.—A native of Mexico, from the high mountains, hence quite a cool Orchid. Sepals and petals white or faint yellow; labellum light pink, suffused with yellow and margined with white.

Trichopilia suavis (sweet in scent).—Native of Costa Rica. Flowers large, five inches across, white, spotted all over with pink; labellum very beautifully crisped, crimson spotted.

Trichopilia tortilis (twisted like a corkscrew).—Native of Mexico. Sepals and petals brownish-yellow, twisted; labellum white, spotted with red. A charming variety.

F.W.Burbidge del. et lith.

DENDROBIUM PARISHII.

V.Brooks Day & Son, Imp.

L.Reeve & Co. 5, Henrietta St. Covent Garden.

Plate XXXIX.

DENDROBIUM PARISHII.

The varieties of this splendid genus seem to be endless; we are constantly receiving new and beautiful additions to the already long list of species ranking under this generic division. With so many favourites to select from, the difficulty has been to decide to which the preference is to be accorded. The subject of the Plate has now been known for some years; it was discovered by the Rev. C. Parish, of Moulmein, to whom we owe so many charming plants, and it is well worthy to bear his name. It is easy to manage in the plains of India, thriving best on a block of wood, and its richly coloured flowers have frequently been exhibited at the meetings of the Agri-Horticultural Society of India.

The plant from which the Plate was drawn, is an unusually deep-coloured variety in the collection of F. Wilkins, Esq., of Leyton, Essex.

The following is a description of some other worthy Dendrobiums which have not been noticed elsewhere in this work:—

Dendrobium aggregatum (side by side, close together).—A native of Upper Assam, Bhootan, and Burmah. A dwarf species, with short bulbous stems, crowned with a single dark green leaf; flower-spike semi-pendulous, bearing six to ten bright apricot-coloured flowers, with a darker spot in the centre of the labellum.

Dendrobium chrysotis (golden-eared).—A new species from Assam. Stems slender and rod like; flowers, five or six together on a slender spike, deep yellow; labellum deeper in colour, richly fringed, and with two intense spots near the base; in character somewhat similar to *Dend. fimbriatum*.

Dendrobium clavatum (club-shaped).—Native of India. Stems two feet high, erect, flowers in panicles of six or seven, orange colour; labellum slightly fringed, with a double brownish-crimson blotch in the centre.

Dendrobium crepidatum (sandal-shaped).—Native of India. Habit semi-pendulous; flowers in pairs, white, edged with pink; labellum stained with yellow.

Dendrobium Dalhousieanum (in compliment to the late Countess of Dalhousie).—A native of Burmah; with stout erect stems, four or five feet long, marked with fine purple lines along their entire length, by which the plant may at any time be recognised; flowers in panicles of six or eight, individually 4 to 5 inches in diameter, cream-coloured, suffused with light rose; labellum covered with down, and furnished with two rich crimson blotches near the centre.

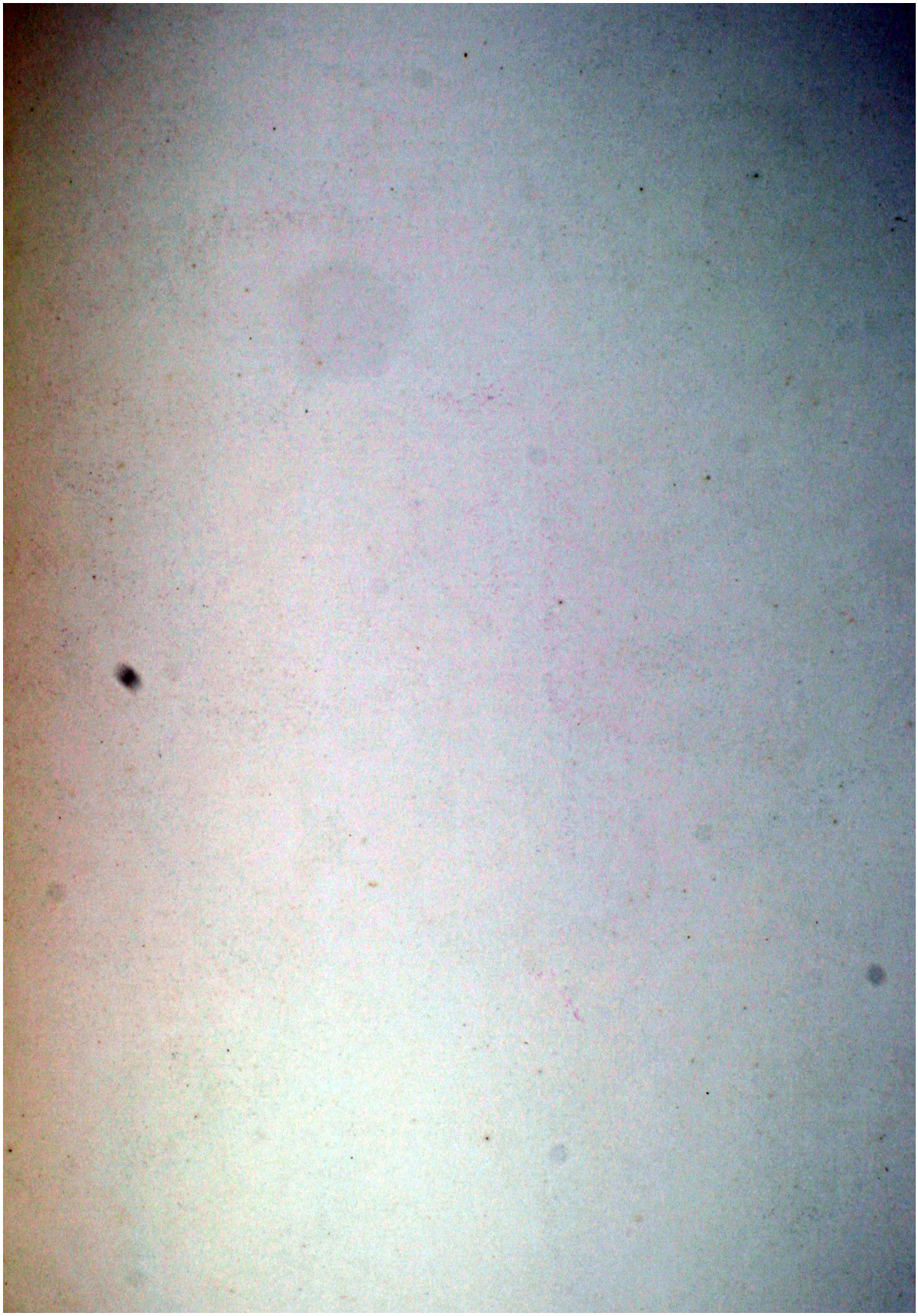
Dendrobium fimbriatum (fringed).—Native of Northern India. Stems two to three feet long; racemes of bloom, drooping, eight to ten flowers on each, bright yellow in colour, labellum deeply fringed; the variety called *occulatum* has a deep purple blotch almost crescent-shaped on the lip.

Dendrobium Gibsoni (discovered by Mr. John Gibson, now so well known for his introduction of the popular subtropical gardening into the London Parks).—Native

of India. Habit erect; stems two feet long, panicle blooming, sepals and petals orange, labellum bright yellow, with a pair of dark purple spots near the base.

Dendrobium moschatum (scented like musk).—Native of India and Burmah. Tall-growing, stems rigid, six feet high, flower racemes sometimes a foot long, flowers large, four inches across, yellow; labellum shaped like a bag, inside colour purple; the odour is exactly that of medicine rhubarb.

Dendrobium Paxtoni (after Sir Joseph Paxton).—Native of India; very similar to *Dend. fimbriatum oculatum;* flowers in racemes, orange-coloured; labellum has a dark brown centre, and the surface is slightly hairy.



F.W.Burbidge del et lith

V.Brooks Day & Son, Imp

DISA GRANDIFLORA.

Parry. 2.50 in hooger

Planch. Longicornu "

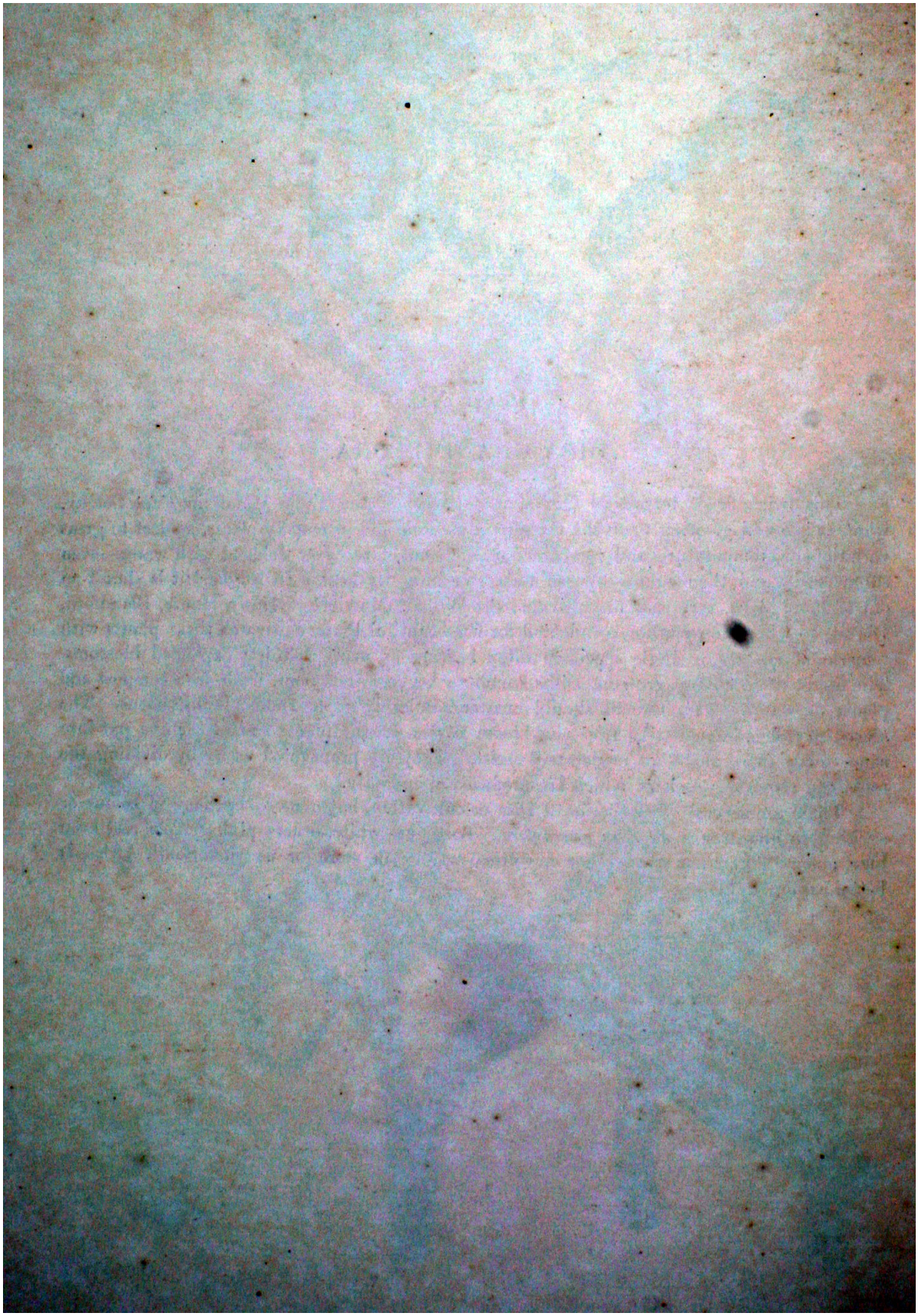
L. Reeve & Co. 5, Henrietta St. Covent Garden.

Plate XL.

DISA GRANDIFLORA.

This magnificent terrestrial Orchid is a native of the Table Mountain, Cape Colony, where it is found growing upon the margins of streams and in marshy places, subject to great variations of temperature and condition, at one time of the year deluged with water—even submerged—and then again exposed to a scorching dry heat. In England it is almost an out-of-doors plant, very easy to cultivate; Sir William Marriott of Down House, Blandford, Dorset, to whom the Author is indebted for the beautiful Plate, cultivates these plants with remarkable success, a single specimen often bearing as many as thirty expanded blossoms. The secret of success in growing Disas seems to be cool treatment, fresh open compost and plenty of water. This Orchid should answer admirably in the Indian Hill Stations. The season of rest is immediately after the bloom passes off, the plants should then be put into some shady place and kept moderately moist. They are propagated easily by dividing the roots and removing suckers, which are produced abundantly.

There are several other species of Disa in cultivation, but none so brilliant in colour or striking in appearance as *Disa grandiflora*. Some are white, others pink, purple, and even blue, and we know not what other novelties may be in store for us when South Africa is better explored.



F.W.Burbidge del et lith.

V.Brooks Day & Son, lap.

LÆLIA MAJALIS

L.Reeve & Co. 5, Henrietta. St. Covent Garden.

Plate XLI.

LÆLIA MAJALIS.

This magnificent plant is interesting as being one of the very earliest known of exotic Orchids. The old Spanish naturalist, Hernandez, describes it in his work on the productions of New Spain, as long ago as the beginning of the last century; yet it is not often seen in bloom in England, as it requires a pure air and plenty of light. The shading it too frequently gets in cultivation, is evidently unnatural to it, and prevents the bulb from ripening. It is a native of Mexico, where it is found growing at some elevation above the sea. Its pseudobulbs are short, and almost spherical; foliage solitary; and it produces a single flower of great beauty from its young growth. In diameter it is sometimes as much as six inches, of a lovely delicate rose colour; the labellum streaked or spotted with lilac; the upper part white. The heat of the plains of India would be too great for it; but in the hills, at an altitude of 3000 feet, it would probably succeed well, grown in a block with the roots protected with moss. It requires a good supply of water when growing, and a rest in the cold season.

In completion of the descriptions of the most favourite species of this genus given under Plates VI. and XXII., may be mentioned the following :—

Lælia acuminata (tapering).—A native of Mexico. One of the winter flowering species. Sepals and petals are white, as is also the labellum, which is, however, furnished with a dark blotch near the base. There is a beautiful variety called *violacea*, in which the flowers are of a rosy-violet colour.

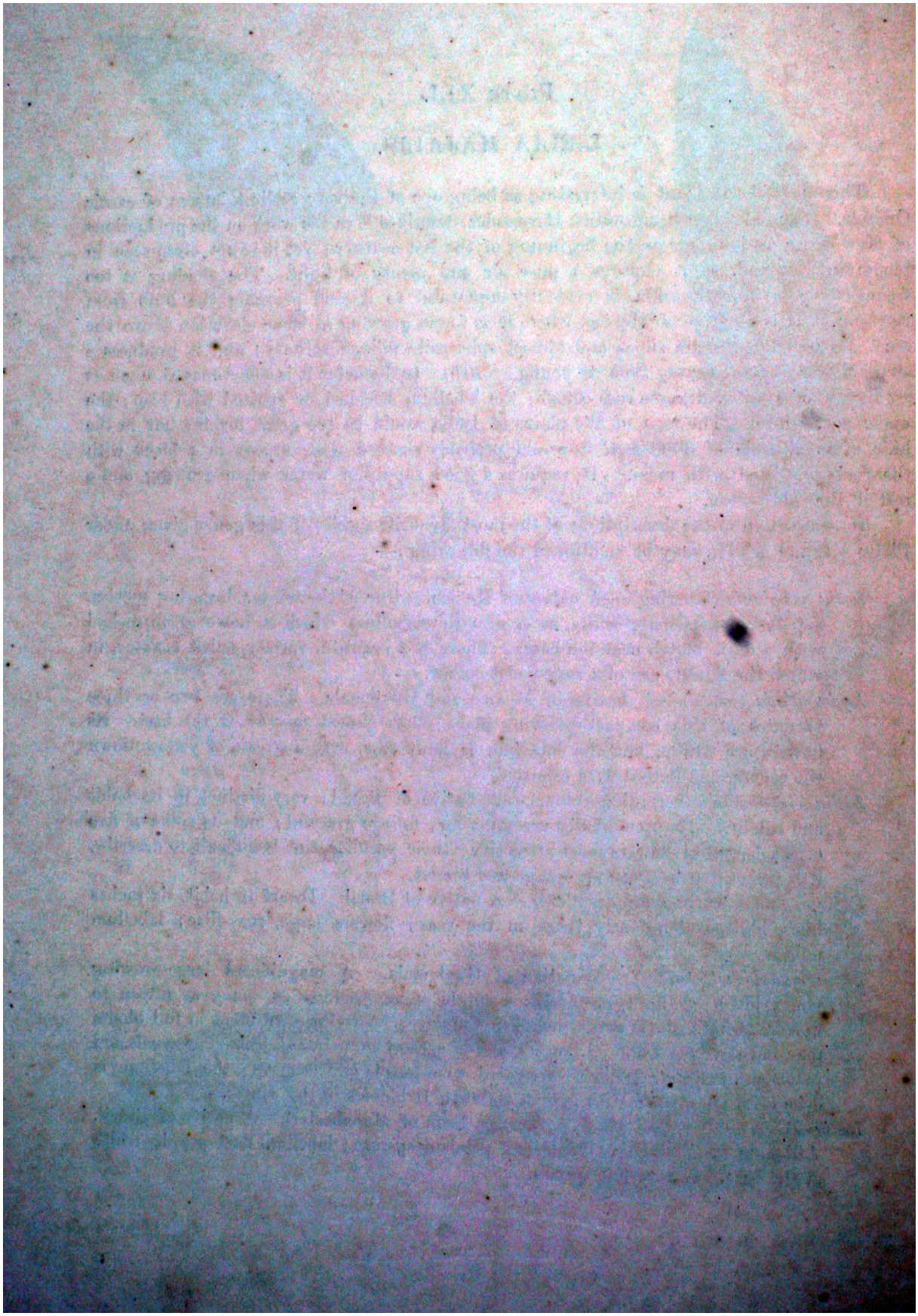
Lælia albida (white).—A native of Mexico and Guatemala. There are two or three varieties of this compact growing plant; that named *superba* is the best. Its flowers are white; but the labellum is faint rose, with a streak of yellow down the centre, and dotted with crimson.

Lælia cinnabarina (vermilion colour).—A native of Brazil; very distinct in its habit and colour. Its pseudobulbs are tapering; foliage graceful; and its spike of five or six beautiful flowers most attractive; their peculiar tint is difficult to describe, it is something between an orange and scarlet.

Lælia præstans (surpassing, excellent).—A native of Brazil. Dwarf in habit, six inches high, blooms abundantly twice in the year; flowers large, rosy-lilac; labellum purple.

Lælia superbiens (stately).—A native of Guatemala. A magnificent large-growing plant, blooming most profusely; a single spike produces as many as fifteen to twenty flowers, six to seven inches in diameter. A well-grown plant in full bloom may have even a hundred flowers, and is a most gorgeous sight. The sepals and petals are mainly rosy-lilac, variegated with purple and crimson; the labellum is deep crimson, striped with golden yellow. It blooms in the winter.

Lælia Turneri (after the late J. A. Turner, Esq., of Manchester).—A native of Brazil. Allied to *Lælia elegans;* sepals and petals deep rose; labellum dark purple, white at the base. A very fine species.



F.W. Burbidge del et lith

V. Brooke Day & Son Imp.

ONCIDIUM MACRANTHUM. Autw 1/3.

L. Reeve & Co. 5 Henrietta St. Covent Garden.

Plate XLII.

ONCIDIUM MACRANTHUM.

Many of the species of this extensive genus are remarkable for the extraordinary profusion of their flowers and the wonderful length of their branching panicles of bloom. No Plate can pretend to afford any notion of such luxuriance; its pseudobulbs are large and shining and its foliage graceful, dark green in colour; its panicles are sometimes twelve to fourteen feet in length, trailing all over the adjacent plants when not supported at intervals to the roof; each flower measures three to four inches in diameter; sepals brownish tipped with yellow; petals broader and rounder than the sepals, golden yellow sometimes streaked with red; the labellum smaller, hastate, deep purple crested with white. It is a native of New Granada, and should succeed well in India, especially where the hot winds do not prevail. Its specific name is in allusion to its broad petals; Lord Londesborough was the first to exhibit this fine plant in England.

It is impossible to describe more than a few of the members of this numerous family, in a work like the present. Under Plates XI. and XXIX. will be found descriptions of some of them, to which may be added the following:—

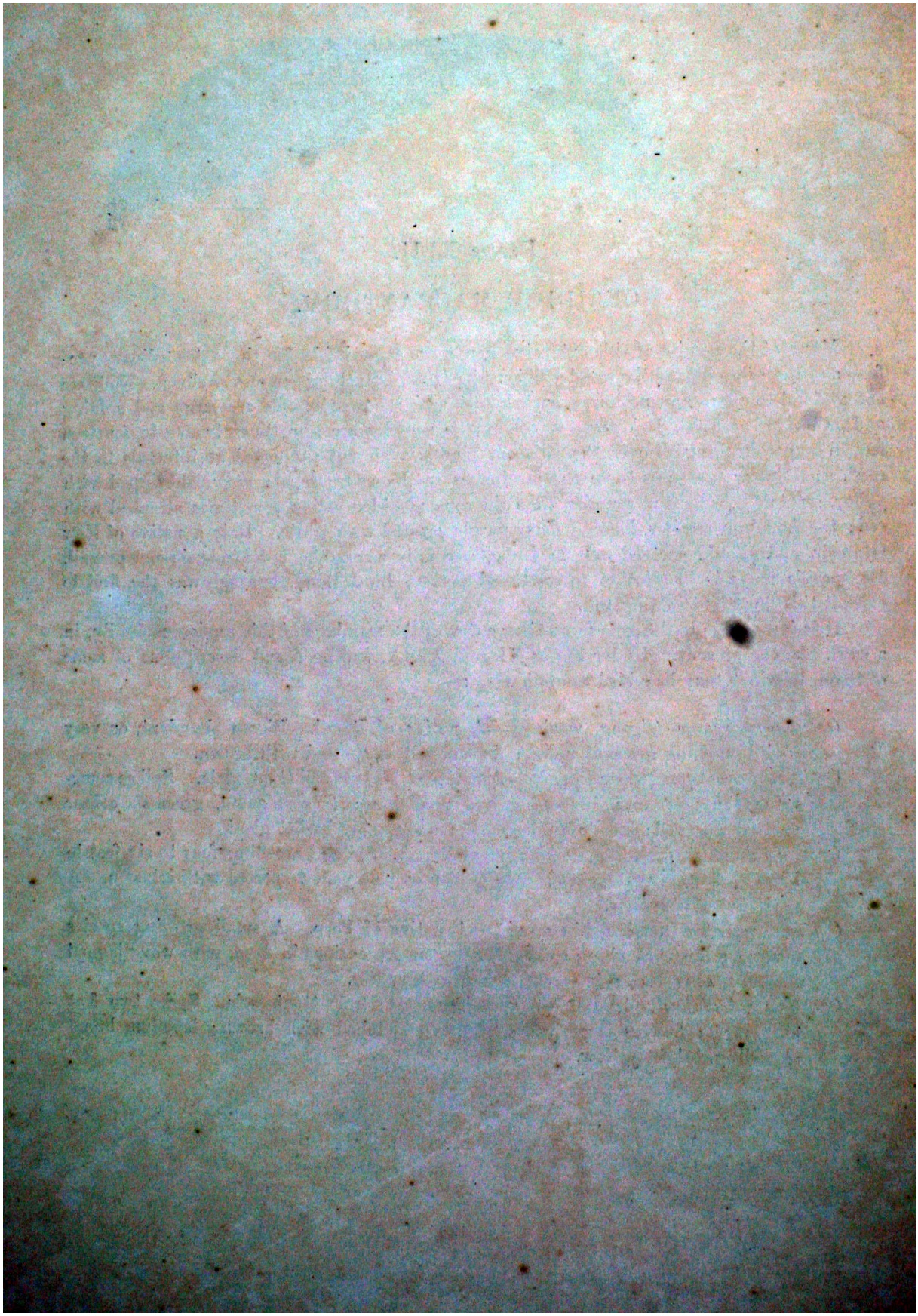
Oncidium flexuosum (zigzag, waving).—A native of Brazil. Bloom abundant, on very long branching graceful spikes; flowers yellow, spotted with brown.

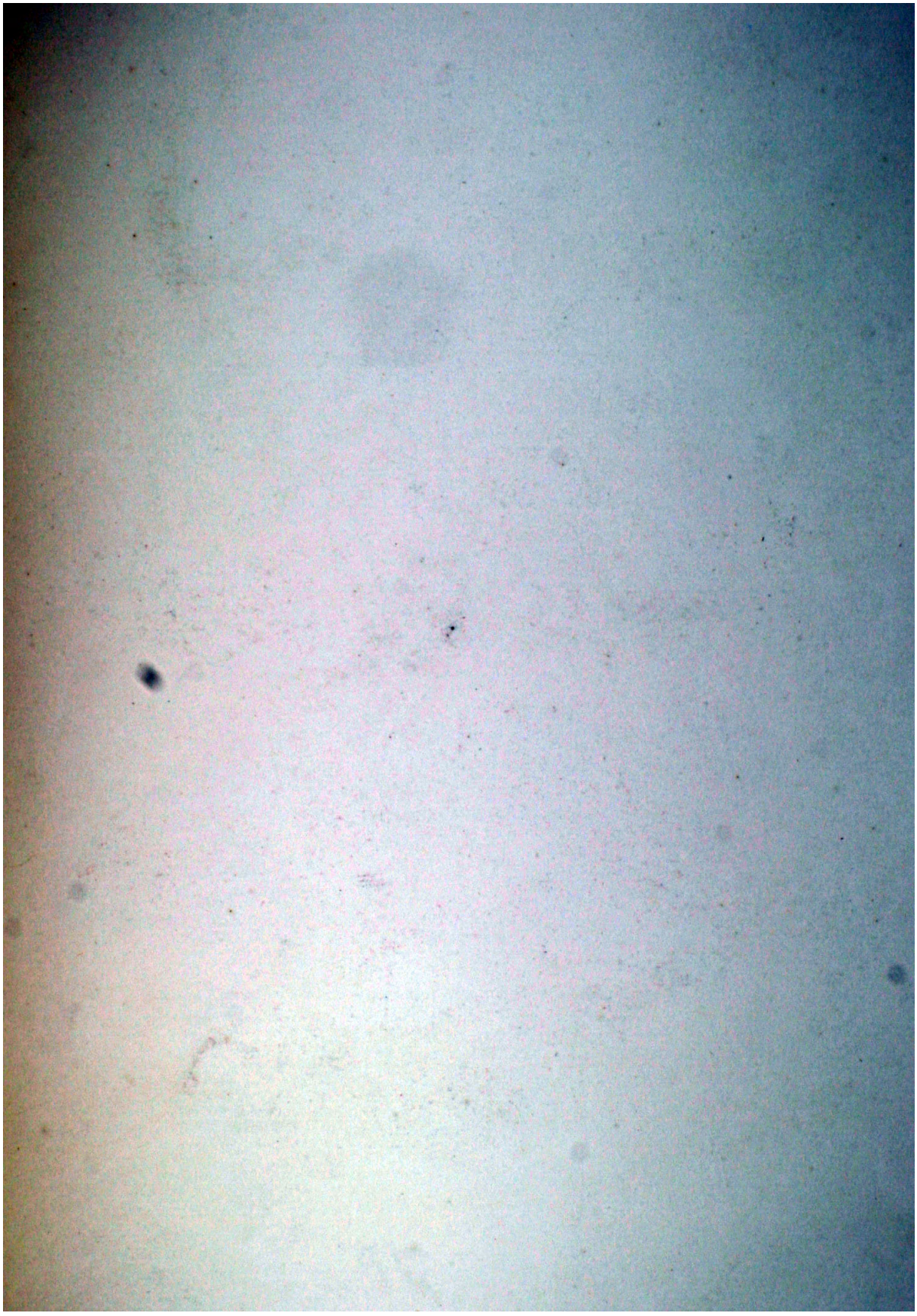
Oncidium leucochilum (white-lipped).—A native of Mexico and Guatemala. Spikes sometimes ten feet long, branching and pendulous; flowers small, greenish colour spotted with red; labellum pure white; a charming basket plant.

Oncidium sarcodes (flesh-like).—A native of Brazil. Spikes branching, four to six feet in length; flowers two inches across, golden or pale yellow spotted with crimson. A very favourite species.

Oncidium serratum (notched like a saw).—A native of Peru. A small growing species bearing a long branching spike; the flowers are curious in form, with wavy jagged margins, olive brown in colour, edged with yellow.

Oncidium splendidum (splendid).—A very rare plant; from Guatemala. Spike two feet long, erect; flowers large, yellowish-green blotched with brown; labellum broad spreading, bright yellow.





F.W. Burbidge del et lith.

V.Brooks Day & Son, Imp.

1. ANÆCTOCHILUS (GOODYERA) ORDIANA.
2. ——— „ ——— „ ——— DAWSONIANUS.

L. Reeve & Co. 5, Henrietta St. Covent Garden.

Plate XLIII.

ANÆCTOCHILUS (Goodyera) DAWSONIANUS—ORDIANA.

These charming little plants even amongst Orchids may very properly be considered gems of the first water. They are all dwarf in habit, not more than a few inches high, and remarkable for the extreme beauty of their foliage; they all succeed very fairly in Calcutta under the treatment described in the chapter devoted to Terrestrial Orchids. In England there seems to be considerable difficulty in preserving them, and in most collections they appear to have been entirely abandoned; the writer does not pretend to say authoritatively what is the cause of this general failure, he would venture to attribute it partly to want of free circulation of air; the practice of keeping them closely shut up under bell glasses would seem to engender damp, whilst the soil generally used—peat—is particularly retentive of moisture. In India they are grown in shallow pans in a mixture of finely broken brick charcoal and silver sand with a slight admixture of leaf mould, on which they flourish well; perfect drainage, pure air, and careful watering seem to be the chief points necessary to secure success.

The flowers should be pinched off as soon as the spike appears, as they are insignificant and only weaken the plant.

The following are amongst the best species for cultivation:—

Anæctochilus Dawsonianus, or, as it is sometimes called, *Goodyera Dawsoniana*, discovered by Dr. Little of Singapore, who has also afforded us the closely allied *Goodyera Ordiana;* in the small islands of the Malay Archipelago. The leaves are of a rich brownish-green, with a glossy velvety appearance, veined with golden purple.

Anæctochilus Ordiana (in compliment to Lady Ord) is similar in shape and habit, but the colour of its leaves is a bright metallic green, with delicate golden lines. Both of these charming plants are more robust in constitution and habit than any of the other species.

Anæctochilus Lowii.—A native of Borneo. Leaves sometimes five inches long, of a rich velvety appearance; colour dark green shaded off to a bright brown and covered with a network of golden veins.

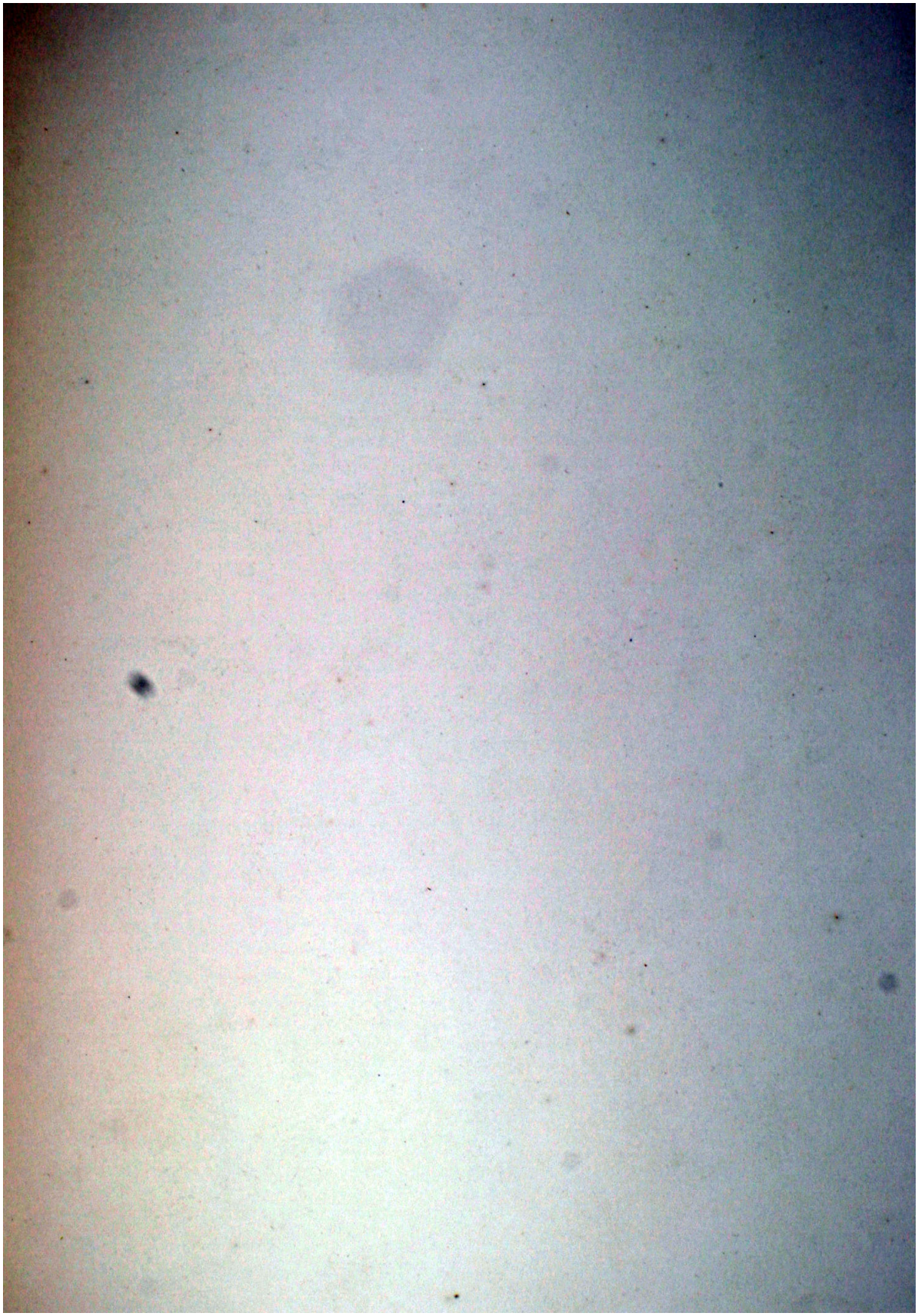
Anæctochilus setaceus (bristle-shaped).—From Java and Ceylon. A good old species; discovered in 1836; the leaves are two inches long; a fine olive-green in colour apparently embroidered all over with reddish golden threads.

Anæctochilus striatus (striped).—Native of Borneo. Leaves longer and narrower than most of the other species; colour bronzy-green with a single white stripe along the mid-rib.

Anæctochilus xanthophyllus (golden-leaved).—From Java. Very like *An. setaceus* as to the colour and golden network of the leaves but with an additional attraction in the shape of a broad yellowish-green band extending from the base to the tip of each leaf.

Macodes petola.—A native of Java with pale green leaves beautifully mottled with brown, and decked with golden network.

The generic name Anæctochilus is derived from the Greek, and has reference to the open lip, a distinguishing feature of their flowers.



F.W.Burbidge del. et lith

V.Brooks Day & Son, Imp.

PERISTERIA ELATA. Fary s f 5.—

L. Reeve & Co. 5, Henrietta St. Covent Garden.

Plate XLIV.

PERISTERIA ELATA.

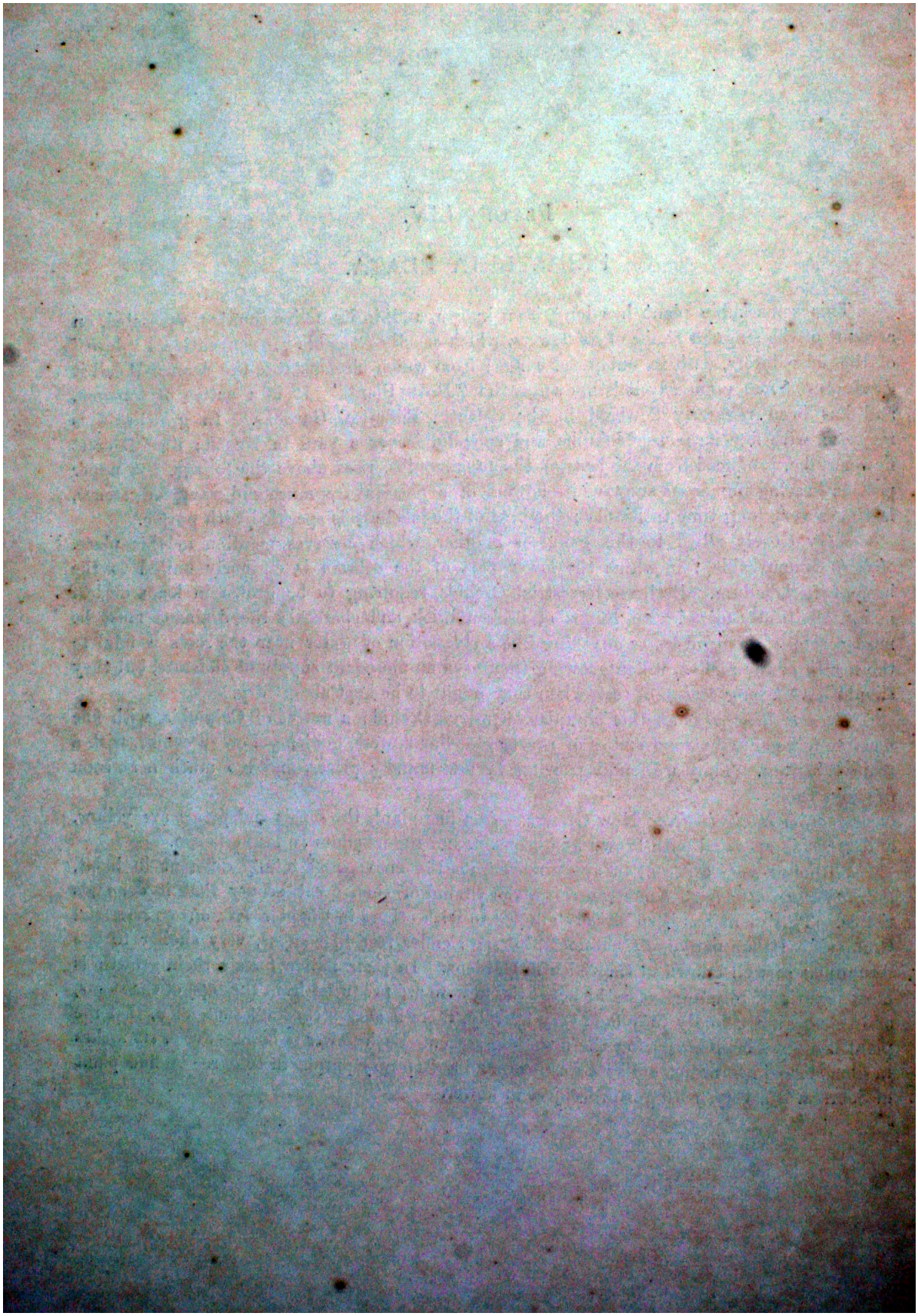
This remarkable plant has long been known, and, in its native country, venerated, on account of the singular shape of its flowers, which exactly resemble the conventional "dove" of the old painters, with its outspread wings; from which circumstance the Spaniards call it *El Santo Spirito;* popularly it is known as the "Dove Plant." It is a native of Panama, and has been regularly flowered in the Calcutta Botanical Gardens. In growth it is majestic, with fine large pseudobulbs, and splendid leaves a yard in length; its tall erect flower spike, produced from the base of the pseudobulbs, rises above the foliage, the upper portion bearing numerous snow-white flowers of a pleasant fragrance and waxy consistence, lasting a very long time in beauty; the base of the labellum is speckled with purple.

Very closely allied to this genus is another, which deserves mention in this place. *Acineta* (immoveable); in which the lower part of the column is curiously united to the base of the labellum. Both are terrestrial Orchids, requiring to be grown in loam or leaf mould plentifully mixed with lumps of broken brick and charcoal; the drainage must be most carefully attended to, as anything like a stagnation of water near the roots is fatal to the health of the plant. When growing they need an abundant supply of moisture, but they should have a long season of rest, when they ought to be kept almost dry.

Anguloa Clowesii is another singular terrestrial Orchid; a native of Columbia, with fine massive foliage, and strong spikes of nearly globular flowers, golden-yellow in colour, with a white labellum. They are found growing in low marshy places, and too much heat soon destroys them.

Anguloa Ruckeri—from New Granada—is a fine plant, the sepals and petals are yellow, and greenish speckled with brown and crimson, and the labellum is deep crimson.

Although very different in appearance from the above, and totally different in habit, *Sobralia macrantha* is an American terrestrial Orchid of such great beauty that it demands notice. This plant has been already alluded to with others in Chapter IX. on "Terrestrial Orchids." It is a native of Guatemala, having slender reed-like stems, very similar to the Arundinas so well known in the Calcutta Gardens. In their native forests their growth is most luxuriant, forming dense thickets; the flowers are produced from the tops of the stems, and though individually they fade very quickly, there is such a constant succession, that the plant is always brilliant during the flowering season. Each flower is large—five or six inches in diameter—in form not unlike a Cattleya, and a deep rosy purple in colour. A fine plant of Sobralia is a very distinguished object in flower.



F.W.Burbidge del et lith.

V.Brooks Day & Son Imp

CATTLEYA LABIATA.

L.Reeve & Co. 5, Henrietta St. Covent Garden.

Plate XLV.

CATTLEYA LABIATA.

Amongst the many magnificent members of the genus, the plant figured is one of the oldest as well as one of the best of them all. It was first introduced into England from Brazil in the year 1818, and the original specimen upon which the genus is founded flowered in the collection of the late Mr. Cattley of Barnet, in honour of whom it was named. Its specific name is in allusion to its broad spreading labellum, a remarkable feature of all Cattleyas. Its strong stems rise to the height of about twenty inches and are surmounted by one or two rigid, oblong leaves, between which is the spathe. The flower-spike bears from one to six splendid blossoms, seven inches in diameter, bright rose in colour. The labellum is undivided, yellow streaked with crimson at the base, and rich deep crimson in front; charmingly crisped; in different varieties however these colours vary greatly, some are very pale, almost white, others violet, purple, magenta; but the texture is always exquisite, firm, and yet translucent with a lustre that belongs to but few flowers. The period for blooming is in autumn when the pseudobulbs have completed their growth, and it lasts a month in beauty.

In completion of the lists of Cattleyas under the description to Plates I., XVIII., XXV. and XXXIII., may be mentioned the following:—

Cattleya citrina (lemon-coloured).—A native of Mexico. Quite different in appearance from every other member of the genus, with its small oval, silvery pseudobulbs lying close to each other, its pair of narrow bluish-green leaves, with its singular habit of growing apparently upside down; with its panicles of bloom hanging downwards, rich yellow in colour; half-closed like a tulip and deliciously fragrant. The plant is always grown on a block of wood and requires cool treatment.

Cattleya quadricolor (four colours).—A rare plant. Native of New Granada. Small in size; pseudobulbs narrow and erect; flowers pure white or faint rose; labellum deep purple banded with white, the upper part yellow.

Cattleya superba (magnificent).—A native of British Guiana, requiring more heat than most of the other Cattleyas. Pseudobulbs one foot high; leaves in pairs; flower-spike bears six or eight splendid rosy flowers; labellum deep crimson, three-lobed, white margined with a yellow throat. This plant would do well in India. It requires abundance of moisture and must never be allowed to become shrivelled, water must be supplied all through the cold season, though in smaller quantity than when in vigorous growth.

F.W.Burbidge del. et lith.

V.Brooks Day & Son, Imp.

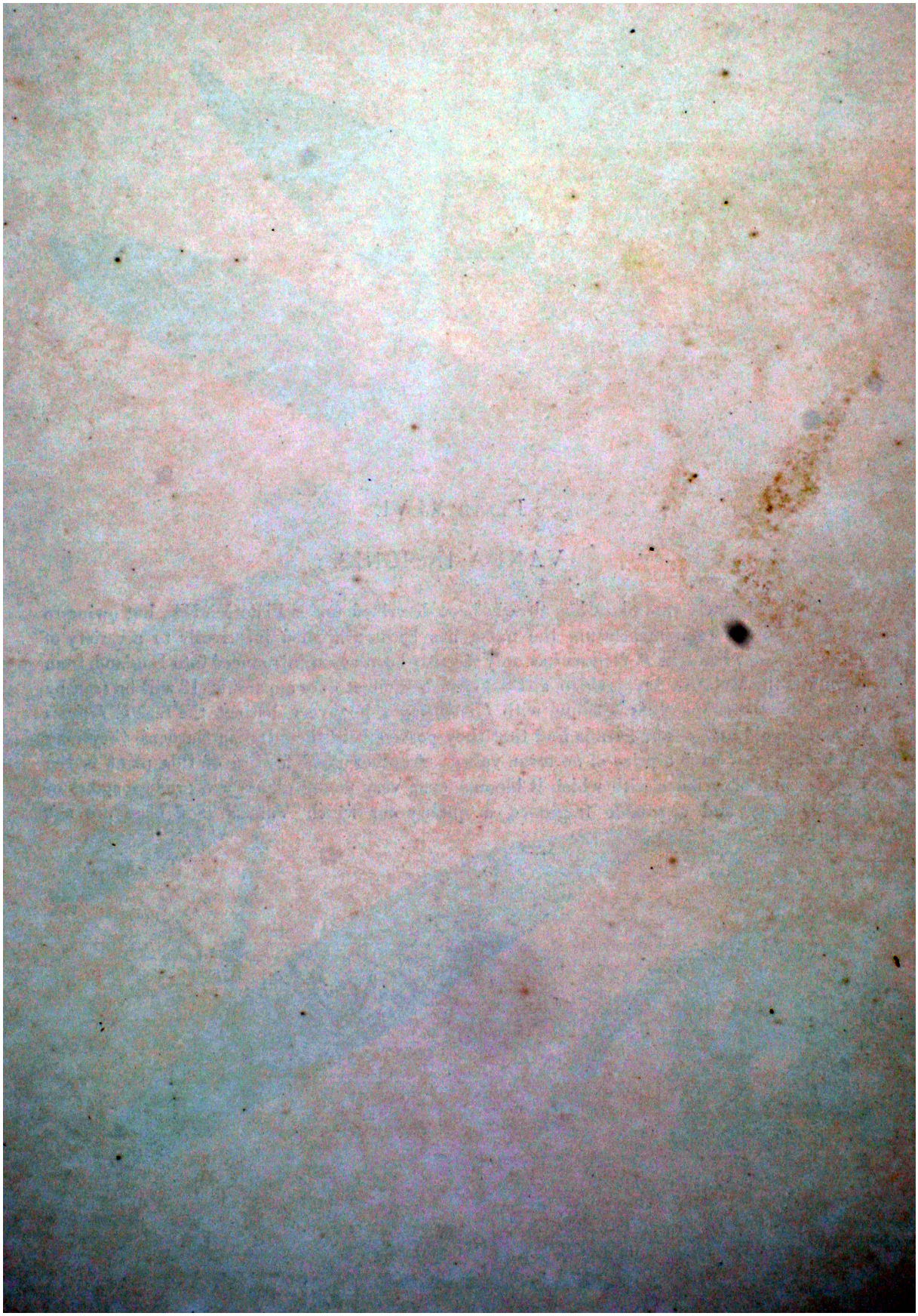
VANDA INSIGNIS. 1 pare 16.-

L. Reeve & Co. 5, Henrietta St. Covent Garden.

Plate XLVI.

VANDA INSIGNIS.

This extremely rare plant has already been described under Plate XXIII., but owing to some confusion of nomenclature the name has become applied incorrectly to a variety of *Vanda tricolor;* the true *V. insignis* has only recently been again introduced into England, from Java and the Malayan Archipelago, and the error became at once apparent. It will be seen by comparing the shape of its labellum with *Vanda suavis,* how very distinct the real *V. insignis* is, and should any of our friends find that they possess it in their Indian Gardens, they may know that they have a prize of no mean value. Another good feature of this plant is the freedom and luxuriance with which it blooms, even very young plants will produce spikes of great beauty and agreeable fragrance, a quality for which Vandas as a class are not remarkable.



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1. PLEIONE (CŒLOGYNE) LAGENARIA
2. ——— „ ——— (CŒLOGYNE) WALLICHIANA.

L. Reeve & Co. 5. Henrietta St. Covent Garden.

Plate XLVII.

PLEIONE (Cœlogyne) LAGENARIA.
„ „ PRÆCOX *v.* WALLICHIANA.

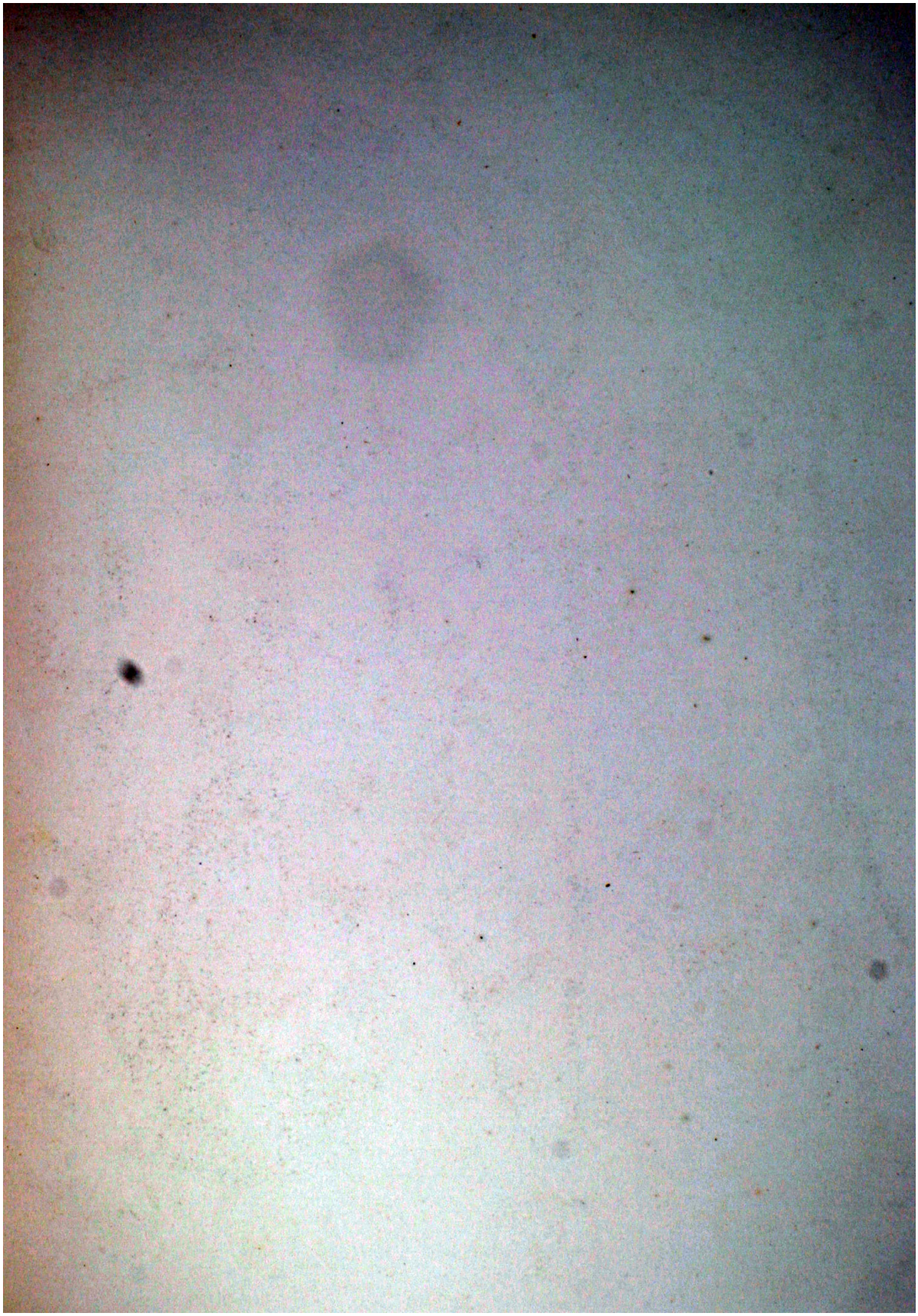
Allusion has already been made to these charming little plants in the descriptions to Plate VII. as Cœlogynes, and botanically there is little doubt that they really belong to that genus. In habit, however, they differ considerably, growing in dense clusters amongst the moss and fern with which the rocks are clothed at high elevations on the Himalayas and Khassia Hills. When at rest they die down, losing their leaves, and almost disappearing, their prettily mottled bulbs being often quite lost in the moss. In spring, however, the hill sides are gay with the abundance of their bloom, and when the flowers fade, the new growth commences to start. In cultivation these little gems are easy to manage; they should be treated almost like terrestrial Orchids, allowed a good season of rest in winter, with but a very moderate water supply, increasing the quantity as soon as the plant begins to bloom. In the plains of India they have often been attempted, but with very indifferent success; the moist heat of the rains almost always induces rot.

Pleione humilis.—A native of Nepaul and Sikkim; at an altitude of 8000 feet; bulbs dark; flowers three inches in diameter, bright rose; labellum white, spotted with crimson, and orange-fringed.

Pleione lagenaria (bottle-shaped).—Native of the Khassias. Sepals and petals deep rose; labellum white; interior yellow; margin streaked with crimson.

Pleione maculata (spotted).—From the Khassia Hills. Sepals and petals white; labellum streaked with crimson.

Pleione præcox Wallichiana.—A native of Sikkim. Flowers rose colour; labellum white in the centre.



F.W.Burbidge del et lith

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CALANTHE VEITCHII.

L. Reeve & Co. 5 Henrietta. St. Covent Garden.

Plate XLVIII.

CALANTHE VEITCHII.

The first Plate in this Volume is a garden hybrid of distinguished beauty, so also is the last, and we are indebted to Messrs. James Veitch and Sons, of Chelsea, for both. Its parents are *Calanthe vestita* on the one hand, and *Limatodes rosea* on the other, and the hybrid combines the best points of both. Its habit of growth is like the former, with a long graceful panicle of bloom; its colour is after the latter, of a rich rosy hue; the spike may at times be seen over six feet in length, supporting a splendid show of bloom; its pseudobulbs are, like the Limatodes, of a peculiar shape, well represented in the Plate. In Calanthe, however, they are ovoid and smooth; the leaves are large, plaited and handsome, falling off in winter.

These plants are terrestrial Orchids, requiring a rich soil well mixed with broken brick and charcoal. The drainage must be perfect, and the pseudobulbs *above* the rim of the pot. When growing they require plenty of water, but only a small supply when at rest.

Limatodes rosea is a native of Moulmein; there are several varieties, distinguished only by the difference in the rich rosy tint of their flowers. The spike is short, proceeding from the base of the bulb. The plant is deciduous.

Calanthe furcata.—A native of India. Flower-spike long; flowers creamy-white.

Calanthe Masuca.—A native of the East Indies, very wide spread; spike erect; flowers violet; labellum deep purple.

Calanthe veratrifolia.—A native of Southern India and Malay Peninsula. Spikes erect; flowers in clusters at the summit; snowy-white.

Calanthe vestita.—Native of Burmah. Deciduous; spike long and branching; flowers white, with a deep crimson spot on the centre of the labellum. In one variety, called *lutea*, this spot is yellow, and in another, called *nivalis*, the flowers are pure white without any spot. A most desirable plant, being a free bloomer and most easily managed.

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INDEX TO ORCHIDS DESCRIBED.

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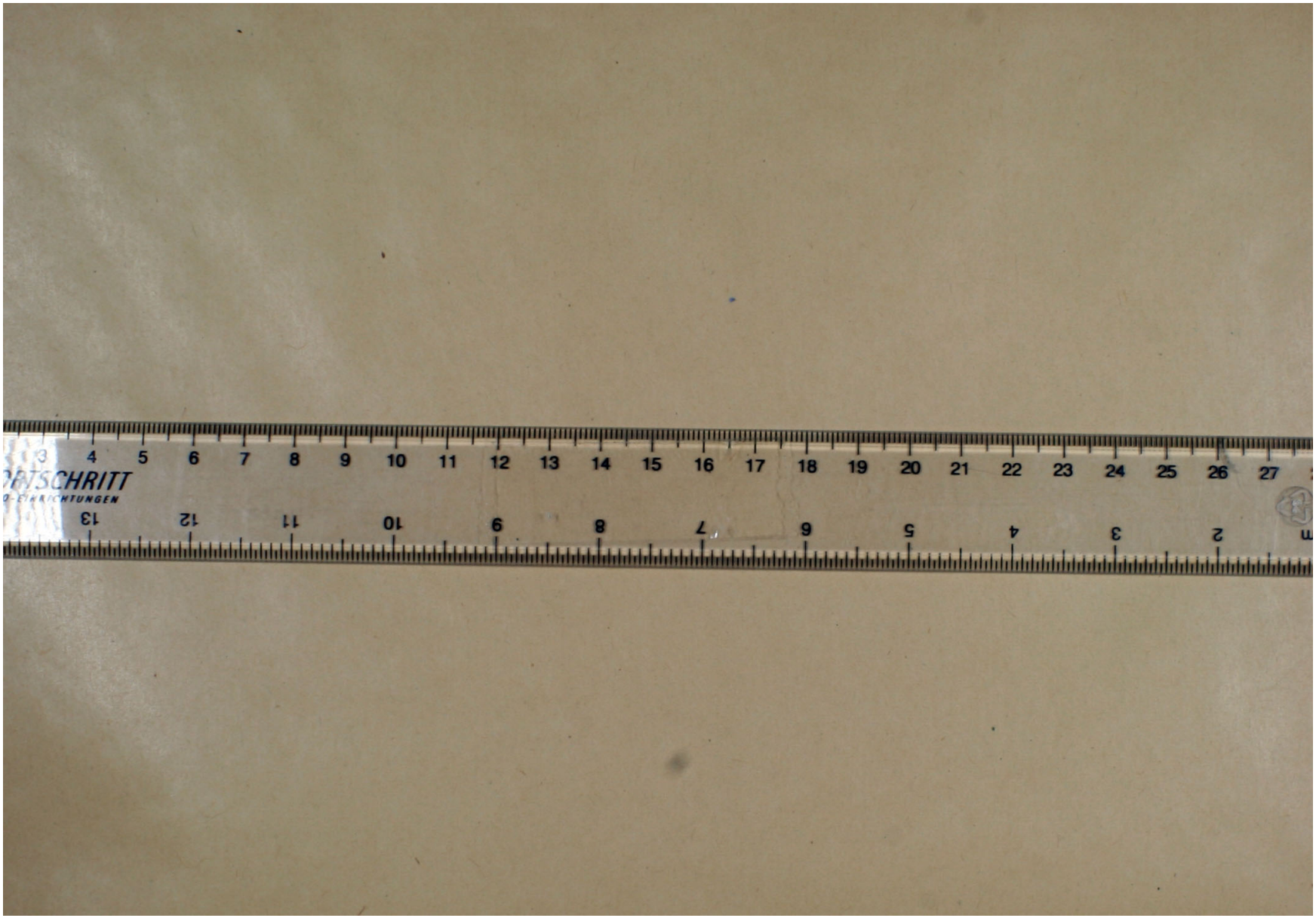
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